MELSEC-L Analog-Digital Converter Module FB Library Reference Manual

Applicable module:

L60AD4

< CONTENTS >

Reference Manual Revision History

Reference Manual Number	Date	Description
FBM-M030-A	2010/06/28	First edition
FBM-M030-B	2011/04/30	Added "Reference Manual Revision History", "Overview", "Chinese version of GX Works2".
FBM-M030-C	2012/03/16	Added the "FB Version Upgrade History" except for the following FBs. 2.14 M+L60AD4_ShiftOperation 2.15 M+L60AD4_DiffOperation 2.19 M+L60AD4_SetInputSignalErrExp 2.20 M+L60AD4_SetDigitalClip 2.21 M+L60AD4_SetShift 2.22 M+L60AD4_SetLoggingPARAM 2.23 M+L60AD4_SetFlowRatePARAM 2.24 M+L60AD4_SaveLogging 2.25 M+L60AD4_MakeFlowRateDailyReport Changed the project name of 2.4 M+L60AD4_ReadAllScalingVal. Added the following FBs. 2.19 M+L60AD4_SetInputSignalErrExp 2.20 M+L60AD4_SetDigitalClip 2.21 M+L60AD4_SetShift 2.22 M+L60AD4_SetLoggingPARAM 2.23 M+L60AD4_SetFlowRatePARAM 2.24 M+L60AD4_SaveLogging 2.25 M+L60AD4_MakeFlowRateDailyReport Added an applicable module list to the contents. Added application examples of the FBs that were added.

1. Overview

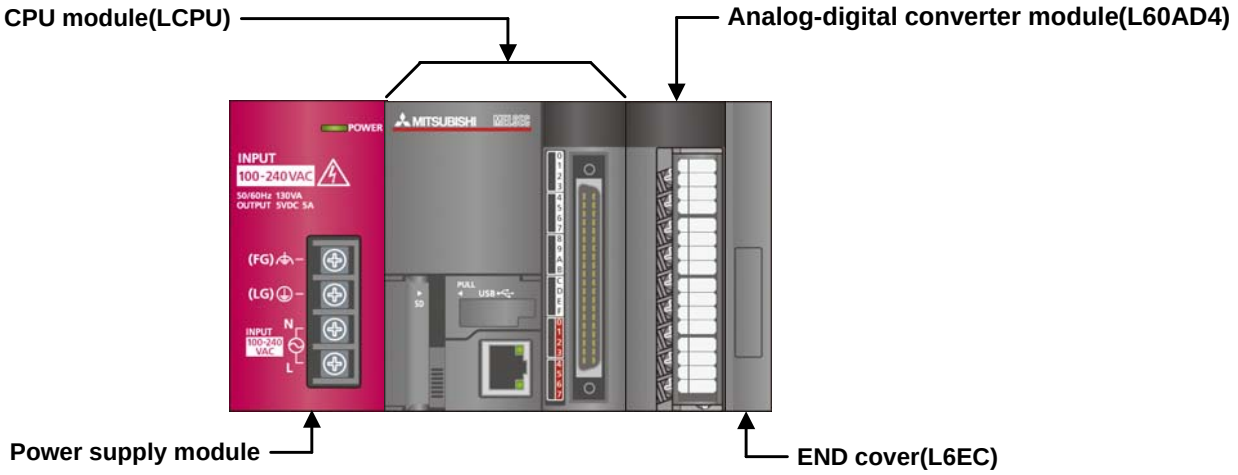
1.1 Overview of the FB Library

This FB library is for using the MELSEC-L L60AD4 analog-digital converter module.

1.2 Function of the FB Library

Item	Description
M+L60AD4_ReadADVal	Read the AD conversion data of a specified channel.
M+L60AD4_ReadAllADVal	Read the AD conversion data of all channels.
M+L60AD4_ReadScalingVal	Read the scaling value (digital operation value) of a specified channel.
M+L60AD4_ReadAllScalingVal	Read the scaling values (digital operation values) of all channels.
M+L60AD4_SetConvertSpeed	Set the conversion speed of a specified module.
M+L60AD4_SetADConversion	Enable or disable AD conversion for a specified channel or all channels.
M+L60AD4_SetAverage	Configure a specified channel for the Averaging processing A/D conversion method.
M+L60AD4_SetScaling	Configure a specified channel's Scaling value output settings.
M+L60AD4_SetProcessAlarm	Configure a specified channel's process alarm settings.
M+L60AD4_SetInputSignalErr	Configure a specified channel's Input signal error detection settings.
M+L60AD4_RequestSetting	Apply changes made to each function's operational condition settings.
M+L60AD4_SetOffsetVal	Set the offset value of a specified channel to the current analog value.
M+L60AD4_SetGainVal	Set the gain value of a specified channel to the current analog value.
M+L60AD4_ShiftOperation	Add the shift amount to the digital value that was input.
M+L60AD4_DiffOperation	Output the difference obtained by subtracting the standard value from the digital value that was input.
M+L60AD4_ErrorOperation	Perform monitoring and reset of intelligent function module error codes
M+L60AD4_OGBackup	Read the offset and gain values from the user range setting, and save to file.
M+L60AD4_OGRestore	Restore the user range offset / gain settings of a module from a file created with M+L60AD4_OGBackup.
M+L60AD4_SetInputSignalErrExp	Set the input signal error detection extension setting of a specified channel.
M+L60AD4_SetDigitalClip	Enable or disable the digital clipping of a specified channel.
M+L60AD4_SetShift	Perform the shift setting of a specified channel.
M+L60AD4_SetLoggingPARAM	Perform the logging function of a specified channel.
M+L60AD4_SetFlowRatePARAM	Set the flow amount integration function of a specified channel.
M+L60AD4_SaveLogging	Save the logging data of a specified channel in a file.
M+L60AD4_MakeFlowRateDailyReport	Save the flow amount daily report data of all channels in a file.

1.3 System Configuration Example



1.4 Relevant manual

MELSEC-L Analog-Digital Converter Module User's Manual

MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)

GX Works2 Version 1 Operating Manual (Common)

GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

1.5 Note

Please make sure to read user's manuals for the corresponding products before using the products.

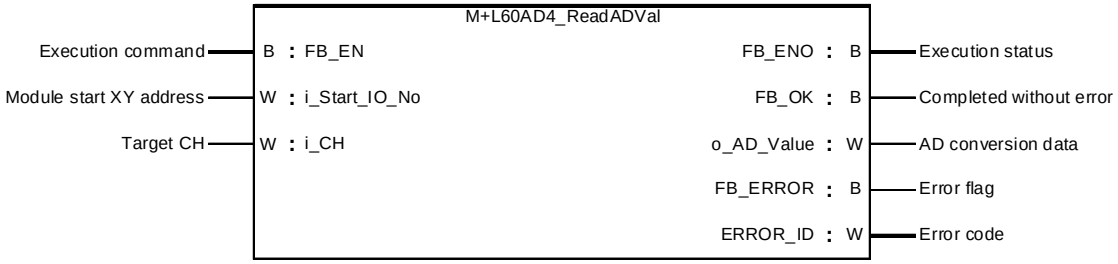
2. Details of the FB Library

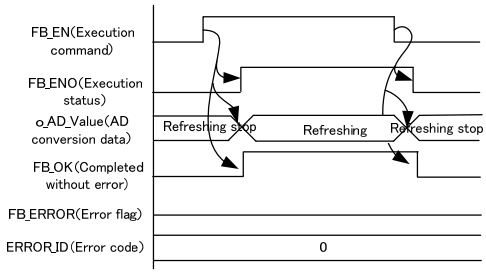
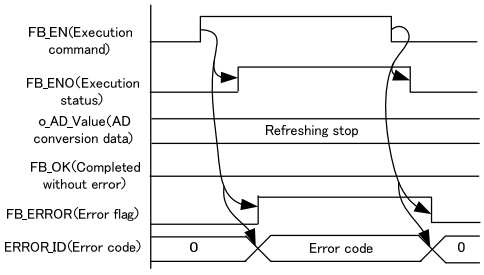
2.1 M+L60AD4_ReadADVal (Read AD conversion data)

FB Name

M+L60AD4_ReadADVal

Function Overview

Item	Description	
Function overview	Read the AD conversion data of a specified channel.	
Symbol		
Applicable hardware and software	Analog-Digital converter module	L60AD4
	CPU module	Series: MELSEC-L Series / Model: LCPU
	Engineering software	GX Works2 *1 English version: Version1.24A or later Chinese version: Version1.49B or later *1 For software versions applicable to the modules used, refer to "Relevant manuals".
Programming language	Ladder	
Number of steps	215 steps (for MELSEC-L series CPU) * The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.	

Item	Description
Function description	1) Reads the AD conversion data of a specified channel when the FB_EN (Execution command) signal is turned ON. 2) The resulting AD conversion data depends on the input range setting. 3) When the target CH setting value is out of range, the FB_ERROR output turns on, processing is interrupted, and the error code is stored in ERROR_ID. Refer to the error code explanation section for details. 4) If the A/D converter module buffer memory is set to auto refresh the digital output value, it is unnecessary to use this FB.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target CH. 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) The input range settings must be properly configured to match devices connected to the L60AD4 module. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Real-time execution
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] [When an error occurs]  
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10(Decimal)	The specified target channel is not valid. The target channel is not within the range of 1 to 4.	Please try again after confirming the setting.

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON,OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted.
Target CH	i_CH	Word	1~4	Specify the CH number.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the AD conversion value read operation was successful.
AD conversion data	o_AD_Value	Word	0	AD conversion data output
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/06/28	First edition
1.01B	2012/03/16	Solved the problem that causes the OPERATION ERROR (error code: 4101) when using an index register number that is used by the FB.

Note

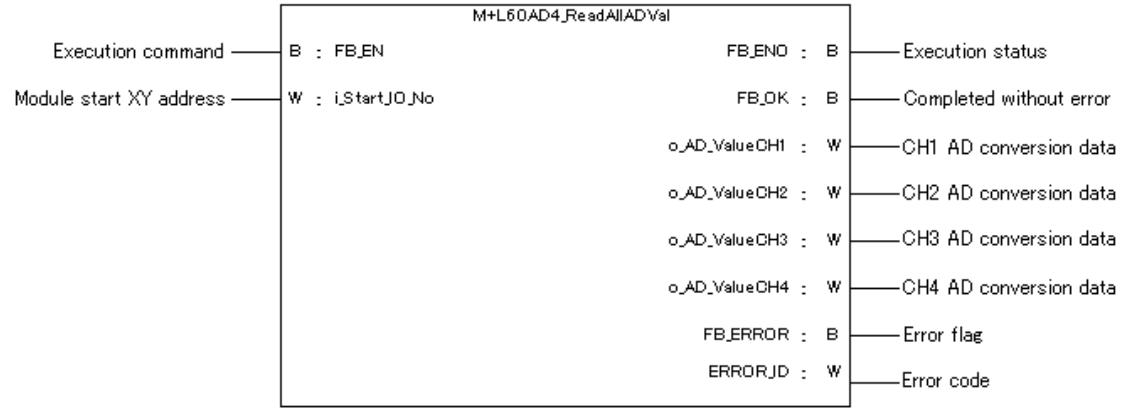
This chapter includes information related to the M+L60AD4_ReadADVal function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

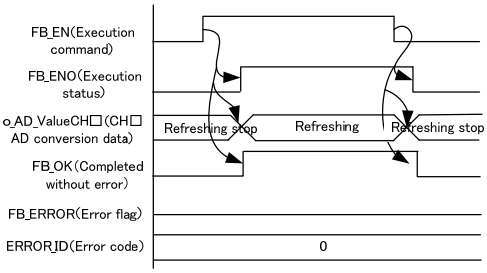
2.2 M+L60AD4_ReadAllADVal (Read all AD conversion data)

FB Name

M+L60AD4_ReadAllADVal

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Read the AD conversion data of all channels.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module.</td><td>L60AD4</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">192 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) Reads the AD conversion data of all channels when the FB_EN (Execution command) signal is turned ON. 2) The resulting AD conversion data depends on the input range setting. 3) If the A/D converter module buffer memory is set to auto refresh the digital output value, it is unnecessary to use this FB.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) This FB uses index registers Z8 and Z9. Please do not use these index registers in an interrupt program. 5) Every input must be provided a value for proper FB operation. 6) The input range settings must be properly configured to match devices connected to the L60AD4 module. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Real-time execution
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] 
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
None	None	None

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the AD conversion value read operation was successful.
CH1 AD conversion data	o_AD_ValueCH1	Word	0	CH1 AD conversion data output
CH2 AD conversion data	o_AD_ValueCH2	Word	0	CH2 AD conversion data output
CH3 AD conversion data	o_AD_ValueCH3	Word	0	CH3 AD conversion data output
CH4 AD conversion data	o_AD_ValueCH4	Word	0	CH4 AD conversion data output
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0

FB Version Upgrade History

Version	Date	Description
1.00A	2010/06/28	First edition
1.01B	2012/03/16	Solved the problem that causes the OPERATION ERROR (error code: 4101) when using an index register number that is used by the FB.

Note

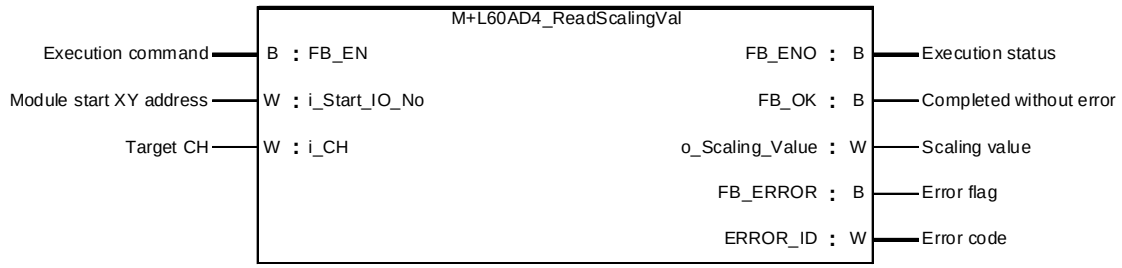
This chapter includes information related to the M+L60AD4_ReadAllADVal function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

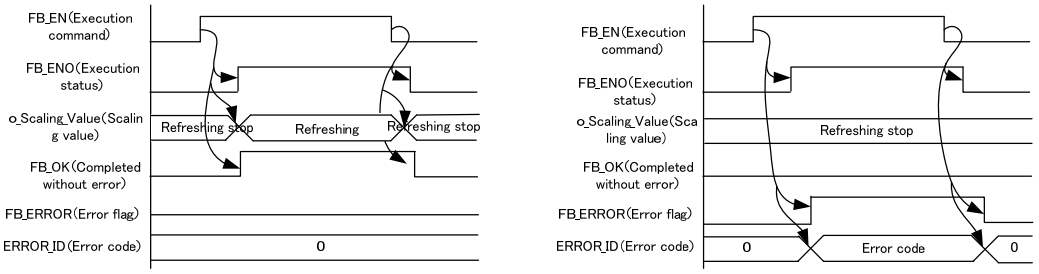
2.3 M+L60AD4_ReadScalingVal (Read scaling value)

FB Name

M+L60AD4_ReadScalingVal

Function Overview

<table>
<tr><td>Item</td><td colspan="2">Description</td></tr>
<tr><td>Function overview</td><td colspan="2">Read the scaling value (digital operation value) of a specified channel.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module.</td><td>L60AD4</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">213 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) Reads the Scaling value (digital operation value) of a specified channel when the FB_EN (Execution command) signal is turned ON. 2) When the target CH setting value is out of range, the FB_ERROR output turns on, processing is interrupted, and the error code is stored in ERROR_ID. Refer to the error code explanation section for details. 3) If the A/D converter module buffer memory is set to auto refresh the scaling value (digital operation value), it is unnecessary to use this FB.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target CH. 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) The input range settings must be properly configured to match devices connected to the L60AD4 module. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Real-time execution
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] [When an error occurs] 
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10(Decimal)	The specified target channel is not valid. The target channel is not within the range of 1 to 4.	Please try again after confirming the setting.

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted.
Target CH	i_CH	Word	1~4	Specify the CH number.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the scaling value (digital operation value) read operation was successful.
Scaling value	o_Scaling_Value	Word	0	Scaling value (digital operation value) output
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/06/28	First edition
1.01B	2012/03/16	Solved the problem that causes the OPERATION ERROR (error code: 4101) when using an index register number that is used by the FB.

Note

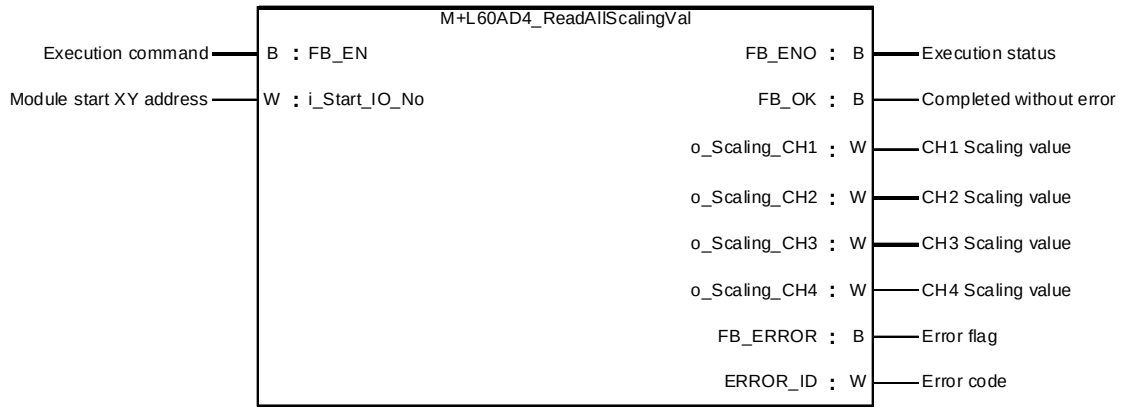
This chapter includes information related to the M+L60AD4_ReadScalingVal function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

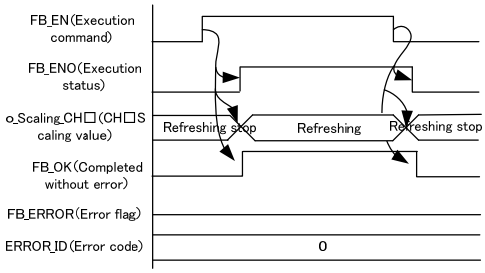
2.4 M+L60AD4_ReadAllScalingVal (Read all scaling values)

FB Name

M+L60AD4_ReadAllScalingVal

Function Overview

<table>
<tr><td>Item</td><td colspan="2">Description</td></tr>
<tr><td>Function overview</td><td colspan="2">Read the scaling values (digital operation values) of all channels.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module.</td><td>L60AD4</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">193 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) Reads the scaling values (digital operation values) of all channels when the FB_EN (Execution command) signal is turned ON. 2) If the A/D converter module buffer memory is set to auto refresh the scaling values (digital operation values), it is unnecessary to use this FB.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 5) Every input must be provided a value for proper FB operation. 6) The input range settings must be properly configured to match devices connected to the L60AD4 module. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Real-time execution
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] 
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
None	None	None

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the scaling value (digital operation value) read operation was successful.
CH1 Scaling value	o_Scaling_CH1	Word	0	CH1 Scaling value (digital operation value) output
CH2 Scaling value	o_Scaling_CH2	Word	0	CH2 Scaling value (digital operation value) output
CH3 Scaling value	o_Scaling_CH3	Word	0	CH3 Scaling value (digital operation value) output
CH4 Scaling value	o_Scaling_CH4	Word	0	CH4 Scaling value (digital operation value) output
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0

FB Version Upgrade History

Version	Date	Description
1.00A	2010/06/28	First edition
1.01B	2012/03/16	Solved the problem that causes the OPERATION ERROR (error code: 4101) when using an index register number that is used by the FB. Changed the project name from M+L60AD4_ReadAllScalinglVal to M+L60AD4_ReadAllScalingVal.

Note

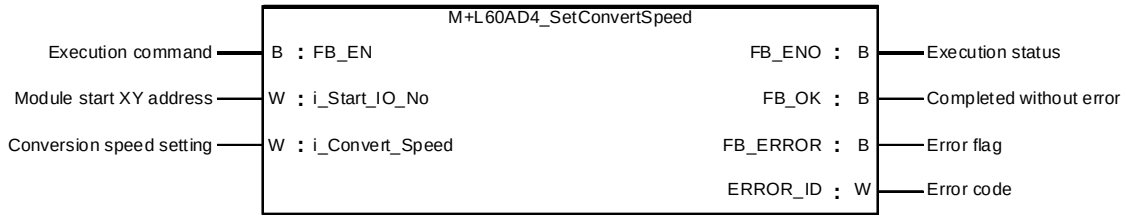
This chapter includes information related to the M+L60AD4_ReadAllScalingVal function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

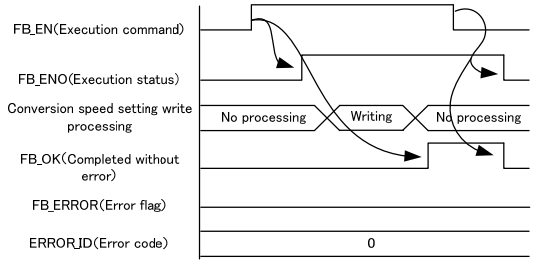
2.5 M+L60AD4_SetConvertSpeed (Conversion speed setting)

FB Name

M+L60AD4_SetConvertSpeed

Function Overview

<table>
<tr><td>Item</td><td colspan="2">Description</td></tr>
<tr><td>Function overview</td><td colspan="2">Set the conversion speed of a specified module.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module.</td><td>L60AD4</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">184 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
<tr><td>Function description</td><td colspan="2">1) Sets the conversion speed when the FB_EN (Execution command) signal is turned ON.
2) FB operation is one-shot only, triggered by the FB_EN signal.
3) The new setting value will not take effect until the 'operation condition setting request' signal (Yn9) is turned (OFF->ON->OFF) or the Operation condition setting request FB (M+L60AD4_RequestSetting) is executed.</td></tr>
<tr><td>Compiling method</td><td colspan="2">Macro type</td></tr>
</table>

Item	Description
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 5) Every input must be provided a value for proper FB operation. 6) If the parameter is set using GX Configurator-AD or the configuration function of GX Works 2, using this FB is unnecessary. 7) The input range settings must be properly configured to match devices connected to the L60AD4 module. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Pulsed execution (1 scan execution type)
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] 
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
None	None	None

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted.
Conversion speed setting	i_Convert_Speed	Word	0H: 20 µs 1H: 80 µs 2H: 1 ms	Specify the conversion speed.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the conversion speed setting has been completed.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0

FB Version Upgrade History

Version	Date	Description
1.00A	2010/06/28	First edition
1.01B	2012/03/16	Solved the problem that causes the OPERATION ERROR (error code: 4101) when using an index register number that is used by the FB.

Note

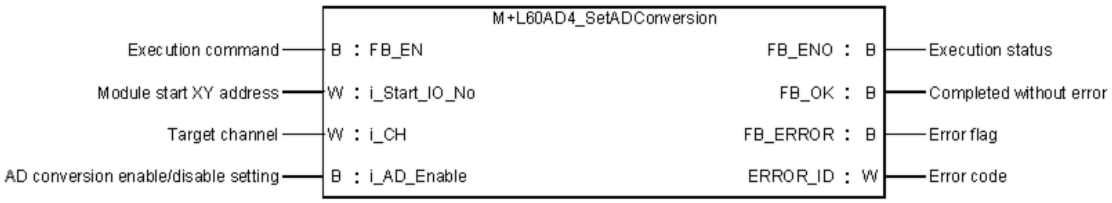
This chapter includes information related to the M+L60AD4_SetConvertSpeed function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

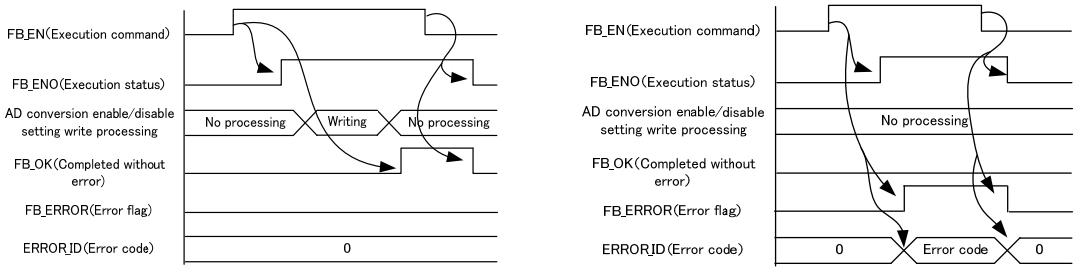
2.6 M+L60AD4_SetADConversion (Enable/disable AD conversion)

FB Name

M+L60AD4_SetADConversion

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Enable or disable AD conversion for a specified channel or all channels.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module.</td><td>L60AD4</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">264 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) Enable or disable AD conversion for a specified channel or all channels by turning on FB_EN (Execution command). 2) FB operation is one-shot only, triggered by the FB_EN signal. 3) The new setting will not take effect until the 'operation condition setting request' signal (Yn9) is turned (OFF->ON->OFF) or the Operation condition setting request FB (M+L60AD4_RequestSetting) is executed. 4) When the target CH setting value is out of range, the FB_ERROR output turns on, processing is interrupted, and the error code is stored in ERROR_ID. Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target CH. 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) If the parameter is set using GX Configurator-AD or the configuration function of GX Works 2, using this FB is unnecessary. 8) The input range settings must be properly configured to match devices connected to the L60AD4 module. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Pulse execution type (1 scan execution type)
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] [When an error occurs] 

Item	Description
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10(Decimal)	The specified target channel is not valid. The target channel is not within the range of 1 to 4.	Please try again after confirming the setting.

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted.
Target CH	i_CH	Word	1~4 or 15	Specify a CH number, 1 to 4 or 15. Use 15 to specify all CH.
AD conversion enable/disable setting	i_AD_Enable	Bit	ON, OFF	ON: Enable the AD conversion value output. OFF: Disable the AD conversion value output.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the AD conversion disable/enable setting has been completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/06/28	First edition
1.01B	2012/03/16	Solved the problem that causes the OPERATION ERROR (error code: 4101) when using an index register number that is used by the FB.

Note

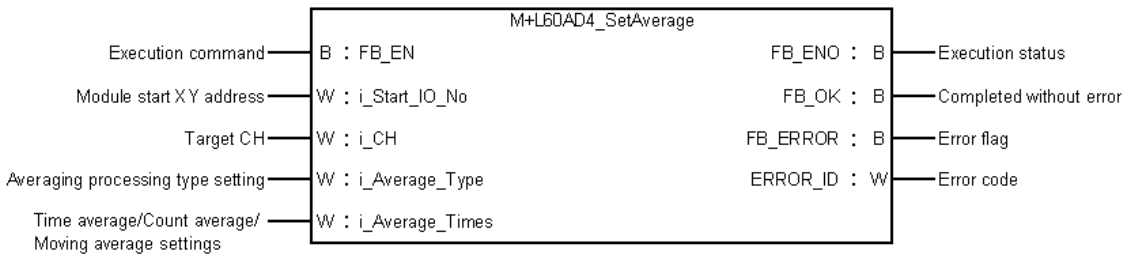
This chapter includes information related to the M+L60AD4_SetADConversion function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

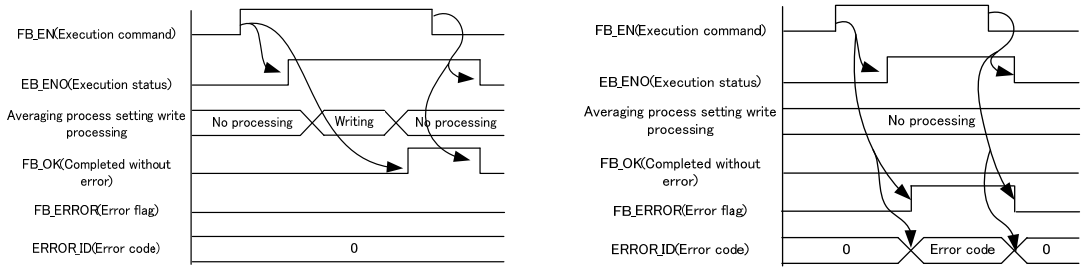
2.7 M+L60AD4_SetAverage (Averaging process setting)

FB Name

M+L60AD4_SetAverage

Function Overview

<table>
<tr><td>Item</td><td colspan="2">Description</td></tr>
<tr><td>Function overview</td><td colspan="2">Configure a specified channel for the Averaging processing A/D conversion method.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module.</td><td>L60AD4</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">323 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) Configure a specified channel for the Averaging processing conversion method by turning on FB_EN (Execution command). 2) FB operation is one-shot only, triggered by the FB_EN signal. 3) The new setting will not take effect until the 'operation condition setting request' signal (Yn9) is turned (OFF->ON->OFF) or the Operation condition setting request FB (M+L60AD4_RequestSetting) is executed. 4) When the target CH setting value is out of range, the FB_ERROR output turns on, processing is interrupted, and the error code is stored in ERROR_ID. Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target CH. 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) If the parameter is set using GX Configurator-AD or the configuration function of GX Works 2, using this FB is unnecessary. 8) The input range settings must be properly configured to match devices connected to the L60AD4 module. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Pulsed execution (1 scan execution type)
FB Operating	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] [When an error occurs] 

Item	Description
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10(Decimal)	The specified target channel is not valid. The target channel is not within the range of 1 to 4.	Please try again after confirming the setting.

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted.
Target CH	i_CH	Word	1~4	Specify the CH number.
Averaging processing type setting	i_Average_Type	Word	0H: Sampling processing 1H: Time average 2H: Count average 3H: Moving average	Specify the averaging processing type.

Name (comment)	Label name	Data type	Setting range	Description
Time average/Count average/Moving average settings	i_Average_Times	Word	Time average: Conversion speed setting: 20 (μs) 2~1500 (ms) Conversion speed setting: 80 (μs) /1 (ms) 2~5000 (ms) Count average: 4~62500 (times) Moving average: 2~1000 (times)	Set the time average, count average and moving average of the specified channel.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the AD averaging processing settings have been completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/06/28	First edition
1.01B	2012/03/16	Solved the problem that causes the OPERATION ERROR (error code: 4101) when using an index register number that is used by the FB.

Note

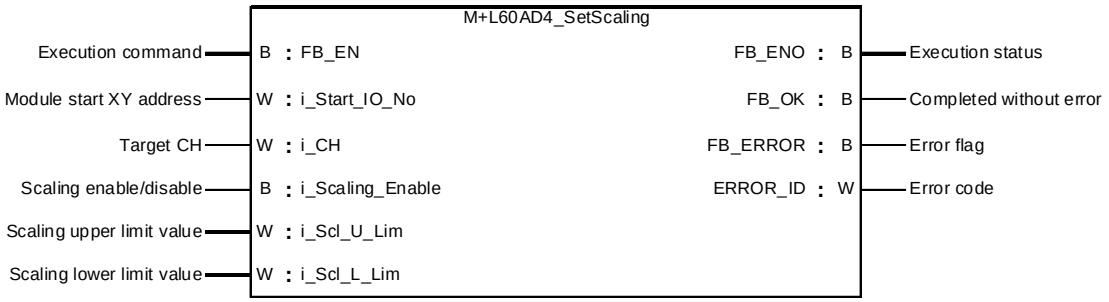
This chapter includes information related to the M+L60AD4_SetAverage function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

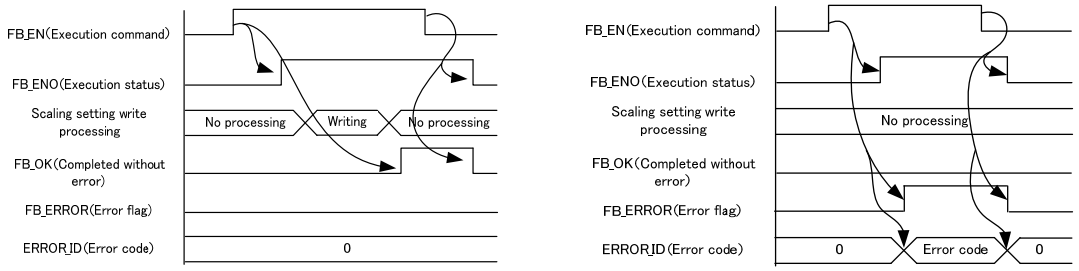
2.8 M+L60AD4_SetScaling (Scaling setting)

FB Name

M+L60AD4_SetScaling

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Configure a specified channel's Scaling value output settings.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module.</td><td>L60AD4</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">259 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) Configure a specified channel's Scaling value output settings by turning on FB_EN (Execution command). 2) FB operation is one-shot only, triggered by the FB_EN signal. 3) The new setting will not take effect until the 'operation condition setting request' signal (Yn9) is turned (OFF->ON->OFF) or the Operation condition setting request FB (M+L60AD4_RequestSetting) is executed. 4) When the target CH setting value is out of range, the FB_ERROR output turns on, processing is interrupted, and the error code is stored in ERROR_ID. Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target CH. 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) If the parameter is set using GX Configurator-AD or the configuration function of GX Works 2, using this FB is unnecessary. 8) The input range settings must be properly configured to match devices connected to the L60AD4 module. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Pulsed execution (1 scan execution type)
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] [When an error occurs] 

Item	Description
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10(Decimal)	The specified target channel is not valid. The target channel is not within the range of 1 to 4.	Please try again after confirming the setting.

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted.
Target CH	i_CH	Word	1~4	Specify the CH number.
Scaling enable/disable	i_Scaling_Enable	Bit	ON, OFF	ON: Enable the scaling. OFF: Disable the scaling.
Scaling upper limit value	i_Scl_U_Lim	Word	-32,000~32,000	Specify the scaling upper limit value.
Scaling lower limit value	i_Scl_L_Lim	Word	-32,000~32,000	Specify the scaling lower limit value.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates the scaling setting have been completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/06/28	First edition
1.01B	2012/03/16	Solved the problem that causes the OPERATION ERROR (error code: 4101) when using an index register number that is used by the FB.

Note

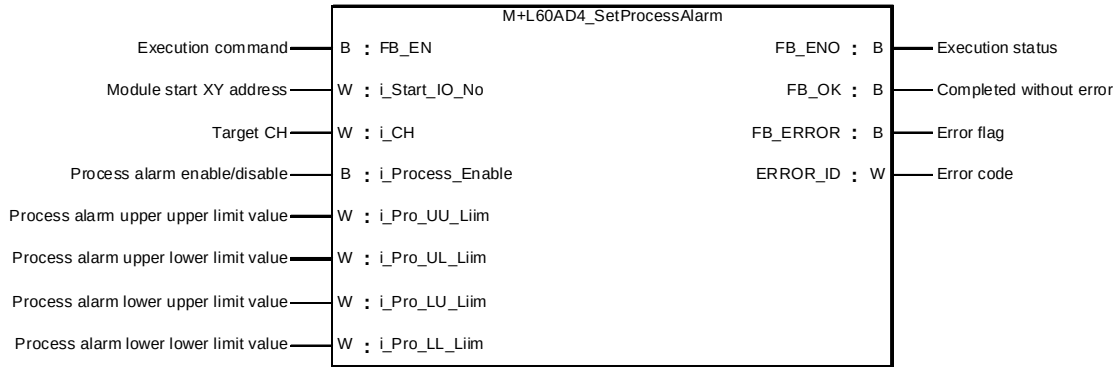
This chapter includes information related to the M+L60AD4_SetScaling function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

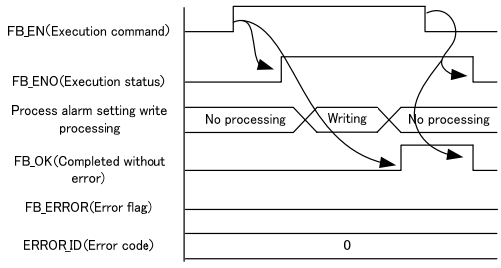
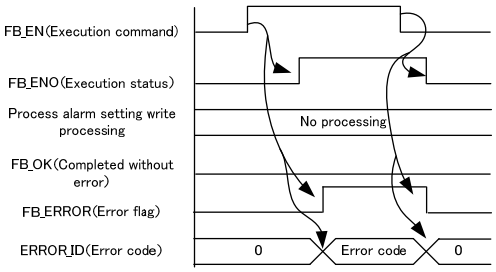
2.9 M+L60AD4_SetProcessAlarm (Process alarm setting)

FB Name

M+L60AD4_SetProcessAlarm

Function Overview

Item	Description	
Function overview	Configure a specified channel's process alarm settings.	
Symbol		
Applicable hardware and software	Analog-Digital converter module.	L60AD4
	CPU module	Series: MELSEC-L Series; Model: LCPU
	Engineering software	GX Works2 *1 English version: Version1.24A or later Chinese version: Version1.49B or later *1 For software versions applicable to the modules used, refer to "Relevant manuals".
Programming language	Ladder	
Number of steps	254 steps (for MELSEC-L series CPU) * The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.	

Item	Description
Function description	1) Configure a specified channel's process alarm settings by turning on FB_EN (Execution command). 2) FB operation is one-shot only, triggered by the FB_EN signal. 3) The new setting will not take effect until the 'operation condition setting request' signal (Yn9) is turned (OFF->ON->OFF) or the Operation condition setting request FB (M+L60AD4_RequestSetting) is executed. 4) When the target CH setting value is out of range, the FB_ERROR output turns on, processing is interrupted, and the error code is stored in ERROR_ID. Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target CH. 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) If the parameter is set using GX Configurator-AD or the configuration function of GX Works 2, using this FB is unnecessary. 8) The input range settings must be properly configured to match devices connected to the L60AD4 module. For information about intelligent function module switch setting, refer to the GX Works2 Version 1 Operation Manual (Common).
FB operation type	Pulsed execution (1 scan execution type)
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error]  [When an error occurs] 

Item	Description
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10(Decimal)	The specified target channel is not valid. The target channel is not within the range of 1 to 4.	Please try again after confirming the setting.

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted.
Target CH	i_CH	Word	1~4	Specify the CH number.
Process alarm enable/disable	i_Process_Enable	Bit	ON, OFF	ON: Enable the warning output of the process alarm. OFF: Disable the warning output of the process alarm.
Process alarm upper upper limit value	i_Pro_UU_Lim	Word	-32,768~32,767	Specify the process alarm upper upper limit value.
Process alarm upper lower limit value	i_Pro_UL_Lim	Word	-32,768~32,767	Specify the process alarm upper lower limit value.
Process alarm lower upper limit value	i_Pro_LU_Lim	Word	-32,768~32,767	Specify the process alarm lower upper limit value.
Process alarm lower lower limit value	i_Pro_LL_Lim	Word	-32,768~32,767	Specify the process alarm lower lower limit value.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	Return error code occurred in FB.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/06/28	First edition
1.01B	2012/03/16	Solved the problem that causes the OPERATION ERROR (error code: 4101) when using an index register number that is used by the FB.

Note

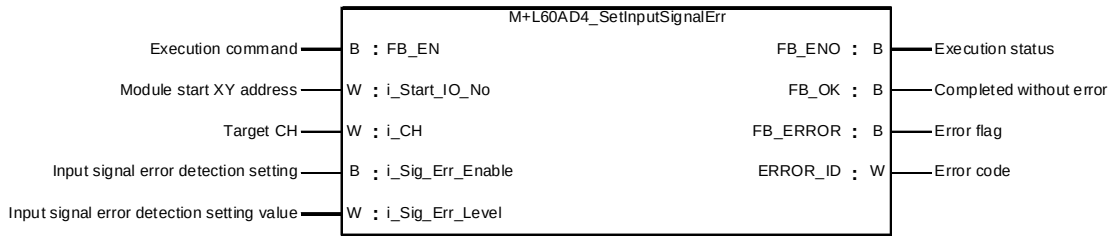
This chapter includes information related to the M+L60AD4_SetProcessAlarm function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

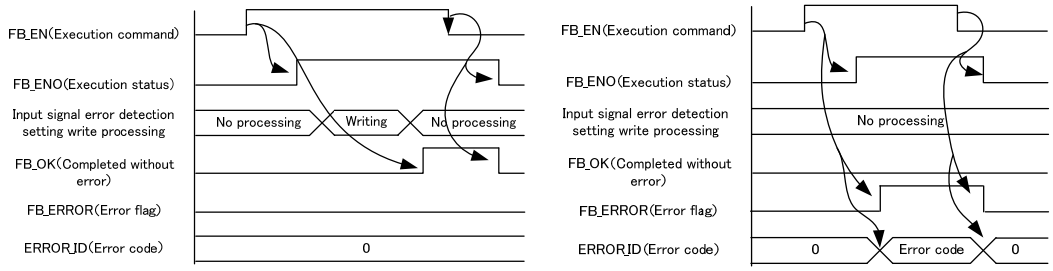
2.10 M+L60AD4_SetInputSignalErr (Input signal error detection setting)

FB name

M+L60AD4_SetInputSignalErr

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Configure a specified channel's Input signal error detection settings.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module.</td><td>L60AD4</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">262 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) Configure a specified channel's Input signal error detection settings by turning on FB_EN (Execution command). 2) FB operation is one-shot only, triggered by the FB_EN signal. 3) The new setting will not take effect until the 'operation condition setting request' signal (Yn9) is turned (OFF->ON->OFF) or the Operation condition setting request FB (M+L60AD4_RequestSetting) is executed. 4) When the target CH setting value is out of range, the FB_ERROR output turns on, processing is interrupted, and the error code is stored in ERROR_ID. Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target CH. 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) If the parameter is set using GX Configurator-AD or the configuration function of GX Works 2, using this FB is unnecessary. 8) The input range settings must be properly configured to match devices connected to the L60AD4 module. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Pulsed execution (1 scan execution type)
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] [When an error occurs] 

Item	Description
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10(Decimal)	The specified target channel is not valid. The target channel is not within the range of 1 to 4.	Please try again after confirming the setting.

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted.
Target CH	i_CH	Word	1~4	Specify the CH number.
Input signal error detection setting	i_Sig_Err_Enable	Bit	ON, OFF	ON: Enable the input signal error detection setting. OFF: Disable the input signal error detection setting.
Input signal error detection setting value	i_Sig_Err_Level	Word	0~250 (Unit: 0.1%)	Specify the input signal error detection setting value.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	Return error code occurred in FB.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/06/28	First edition
1.01B	2012/03/16	Solved the problem that causes the OPERATION ERROR (error code: 4101) when using an index register number that is used by the FB.

Note

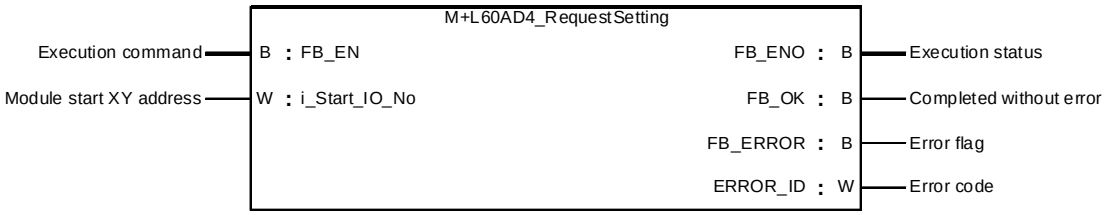
This chapter includes information related to the M+L60AD4_SetInputSignalErr function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

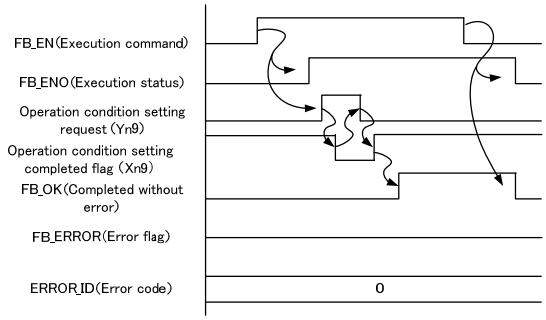
2.11 M+L60AD4_RequestSetting (Operation condition setting request)

FB Name

M+L60AD4_RequestSetting

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Apply changes made to each function's operational condition settings.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module.</td><td>L60AD4</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">176 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
<tr><td>Function description</td><td colspan="2">1) Enables settings of all channels by turning on FB_EN (Execution command).
For information on the settings that are enabled, refer to the MELSEC-L Analog-Digital Converter Module User's Manual.
2) When FB_EN is turned ON, the FB will continue to execute until the settings for each function are completed.</td></tr>
<tr><td>Compiling method</td><td colspan="2">Macro type</td></tr>
</table>

Item	Description
Restrictions and precautions	1) The AD conversion process is interrupted by executing this FB. After the FB execution is complete and FB_OK turns ON, the AD conversion process will resume. 2) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) The FB cannot be used in an interrupt program. 5) This FB uses index register Z9. Please do not use Z9 in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) When this FB is used in two or more places, a duplicated coil warning will occur during compile operation due to the Y signal being operated by index modification. However this is not a problem and the FB will operate without error. 8) The input range settings must be properly configured to match devices connected to the L60AD4 module. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Pulse execution type (multiple scan execution type)
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] 
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
None	None	None

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the operational condition settings have been completed.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0

FB Version Upgrade History

Version	Date	Description
1.00A	2010/06/28	First edition
1.01B	2012/03/16	Solved the problem that causes the OPERATION ERROR (error code: 4101) when using an index register number that is used by the FB.

Note

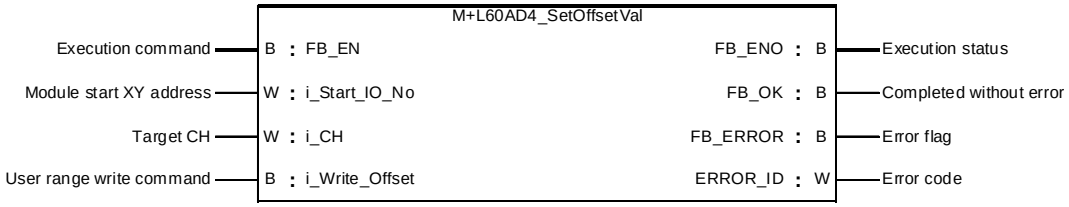
This chapter includes information related to the M+L60AD4_RequestSetting function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

2.12 M+L60AD4_SetOffsetVal (Offset setting)

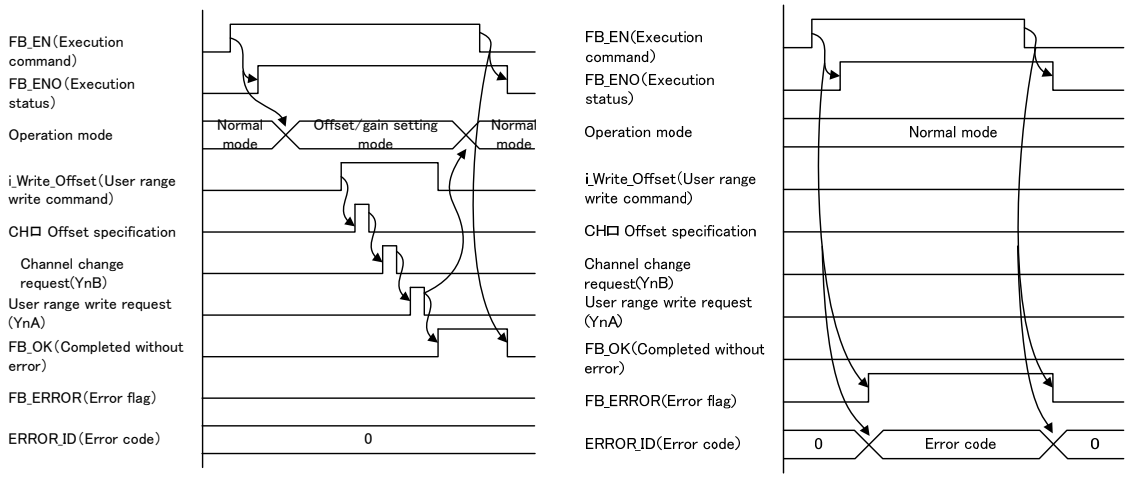
FB Name

M+L60AD4_SetOffsetVal

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Set the offset value of a specified channel to the current analog value.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module.</td><td>L60AD4</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">375 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) Set the offset value of a specified channel to the current analog value by turning on FB_EN (Execution command). 2) To write the offset value, both FB_EN and the User range write command must be ON. 3) If the User range write command is ON when FB_EN is turned ON, the FB will continue to execute until the offset value of the specified channel is written. 4) When the target CH setting value is out of range, the FB_ERROR output turns on, processing is interrupted, and the error code is stored in ERROR_ID. Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The AD conversion process is interrupted by executing this FB. After the FB execution is complete and FB_OK turns ON, the AD conversion process will resume. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target CH. 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) If the parameter is set using GX Configurator-AD or the configuration function of GX Works 2, using this FB is unnecessary. 8) When this FB is used in two or more places, a duplicated coil warning will occur during compile operation due to the Y signal being operated by index modification. However this is not a problem and the FB will operate without error. 9) The input range settings must be properly configured to match devices connected to the L60AD4 module. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Pulse execution type (multiple scan execution type)
Application example	Refer to "Appendix 1 - FB Library Application examples"

Item	Description
Timing chart	[When operation completes without error] [When an error occurs] 
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10(Decimal)	The specified target channel is not valid. The target channel is not within the range of 1 to 4.	Please try again after confirming the setting.

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted.
Target CH	i_CH	Word	1~4	Specify the CH number.
User range write command	i_Write_Offset	Bit	ON, OFF	ON: Perform the user range write operation. OFF: Do not perform the user range write operation.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that writing of the offset value has completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/06/28	First edition
1.01B	2012/03/16	Solved the problem that causes the OPERATION ERROR (error code: 4101) when using an index register number that is used by the FB.

Note

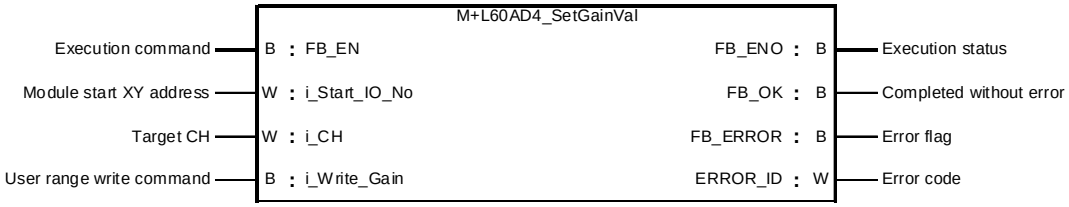
This chapter includes information related to the M+L60AD4_SetOffestVal function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

2.13 M+L60AD4_SetGainVal (Gain setting)

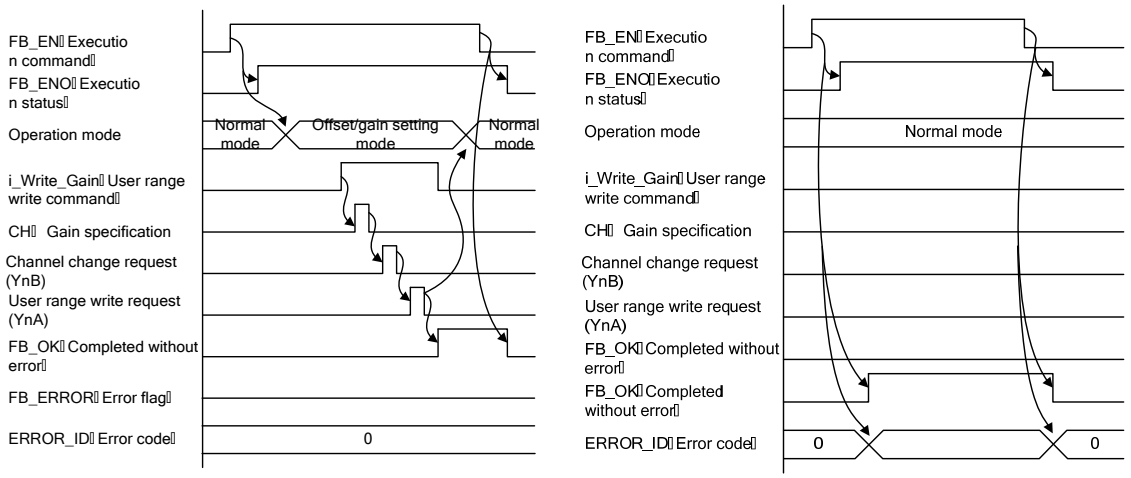
FB Name

M+L60AD4_SetGainVal

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Set the gain value of a specified channel to the current analog value.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module.</td><td>L60AD4</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">362 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) Set the gain value of a specified channel to the current analog value by turning on FB_EN (Execution command). 2) To write the gain value, both FB_EN and the User range write command must be ON. 3) If the User range write command is ON when FB_EN is turned ON, the FB will continue to execute until the gain value of the specified channel is written. 4) When the target CH setting value is out of range, the FB_ERROR output turns on, processing is interrupted, and the error code is stored in ERROR_ID. Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) The When two or more of these FBs are used, precaution must be taken to avoid repetition of the target CH. 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) If the parameter is set using GX Configurator-AD or the configuration function of GX Works 2, using this FB is unnecessary. 8) When this FB is used in two or more places, a duplicated coil warning will occur during compile operation due to the Y signal being operated by index modification. However this is not a problem and the FB will operate without error. 9) The input range settings must be properly configured to match devices connected to the L60AD4 module. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Pulse execution type (multiple scan execution type)
Application example	Refer to "Appendix 1 - FB Library Application examples"

Item	Description
Timing chart	[When operation completes without error] [When an error occurs] 
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10(Decimal)	The specified target channel is not valid. The target channel is not within the range of 1 to 4.	Please try again after confirming the setting.

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted.
Target CH	i_CH	Word	1~4	Specify the CH number.
User range write command	i_Write_Gain	Bit	ON, OFF	ON: Perform the user range write operation. OFF: Do not perform the user range write operation.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the gain setting is completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/06/28	First edition
1.01B	2012/03/16	Solved the problem that causes the OPERATION ERROR (error code: 4101) when using an index register number that is used by the FB.

Note

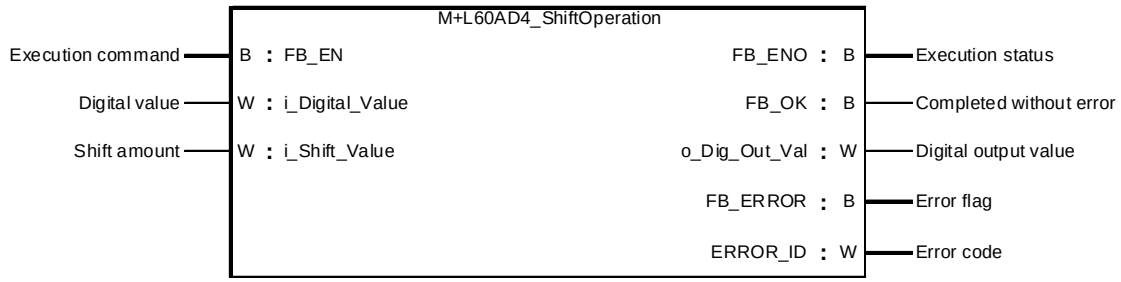
This chapter includes information related to the M+L60AD4_SetGainVal function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

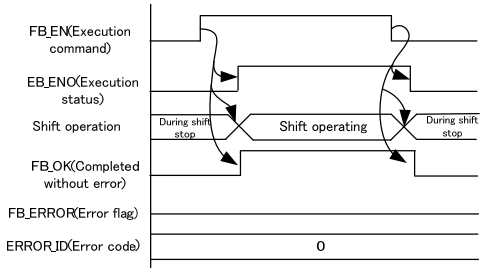
2.14 M+L60AD4_ShiftOperation (Shift operation)

FB Name

M+L60AD4_ShiftOperation

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Add the shift amount to the digital value that was input.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module.</td><td>L60AD4</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">183 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
<tr><td>Function description</td><td colspan="2">1) i_Shift_Value(Shift amount) is added to i_Digital_Value (digital value) by turning on FB_EN (Execution command).
2) When the result is less than -32768, the digital output value will be -32768. When the result is greater than 32767, the digital output value will be 32767.</td></tr>
<tr><td>Compiling method</td><td colspan="2">Macro type</td></tr>
</table>

Item	Description
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) A/D converter modules whose first five digits of serial number are 13041 or later have a shift function as a module function. When using the shift function of the module function, do not use this FB. 5) Every input must be provided a value for proper FB operation. 6) The input range settings must be properly configured to match devices connected to the L60AD4 module. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common). 7) When FB_OK (Completed without error) is turns ON, the o_Dig_Out_Val (Digital output value) becomes valid. 8) When FB_EN turns OFF, o_Dig_Out_Val (Digital output value) is cleared to zero.
FB operation type	Real-time execution
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] 
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
None	None	None

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Digital value	i_Digital_Value	Word	-32,768~32,767	Specify the digital value to which to add the shift amount that was read.
Shift amount	i_Shift_Value	Word	-32,768~32,767	Specify the shift amount.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the shifted value has been calculated.
Digital output value	o_Dig_Out_Val	Word	0	Storage location for the sum of the Digital value and the Shift amount.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always ON

FB Version Upgrade History

Version	Date	Description
1.00A	2010/06/28	First edition

Note

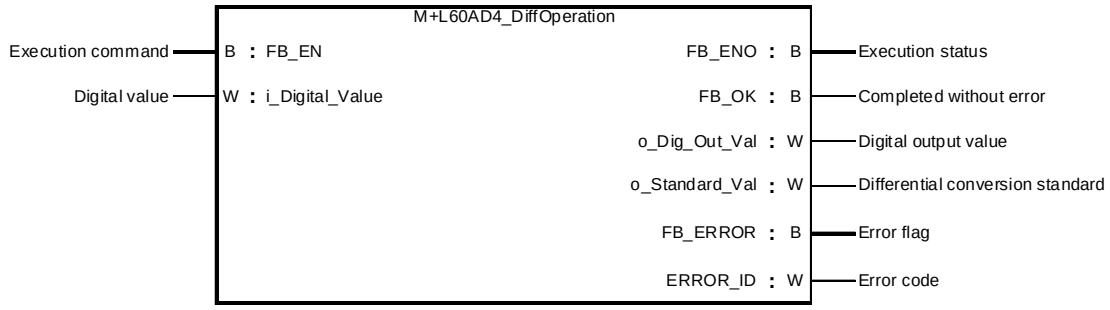
This chapter includes information related to the M+L60AD4_ShiftOperation function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

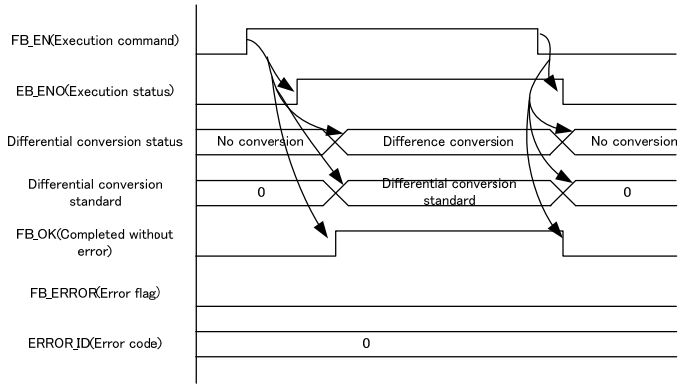
2.15 M+L60AD4_DiffOperation (Differential conversion process)

FB Name

M+L60AD4_DiffOperation

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Output the difference obtained by subtracting the standard value from the digital value that was input.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module.</td><td>L60AD4</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">200 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) When FB_EN (Execution command) is turned ON, the Digital value (i_Digital_Value) input at the time of turning ON is saved as the Differential conversion standard. 2) i_Digital_Value (Digital value) when FB_EN (Execution command) changes from OFF to ON is o_Standard_Val (Differential conversion standard). As long as FB_EN (Execution command) remains ON, the difference obtained by subtracting o_Standard_Val (Differential conversion standard) from i_Digital_Value (Digital value) is output.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) A/D converter modules whose first five digits of serial number are 13041 or later have a shift function as a module function. When using the shift function of the module function, do not use this FB. 5) Every input must be provided a value for proper FB operation. 6) The input range settings must be properly configured to match devices connected to the L60AD4 module. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common). 7) When FB_OK (Completed without error) is ON, o_Dig_Out_Val (Digital output value) and o_Standard_Val (Differential conversion standard) are valid. 8) Turning off FB_EN clears o_Dig_Out_Val (Digital output value) and o_Standard_Val (Differential conversion standard) to zero.
FB operation type	Real-time execution
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] 

Item	Description
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
None	None	None

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Digital value	i_Digital_Value	Word	-32,768~32,767	Specify the digital value for which to perform the differential conversion.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the differential conversion process is taking place.
Digital output value	o_Dig_Out_Val	Word	0	The result of subtracting the Differential conversion standard from the current Digital value.
Differential conversion standard	o_Standard_Val	Word	0	The basis of comparison for differential processing. This value is equal to the Digital value when FB_EN changes from OFF to ON.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/06/28	First edition

Note

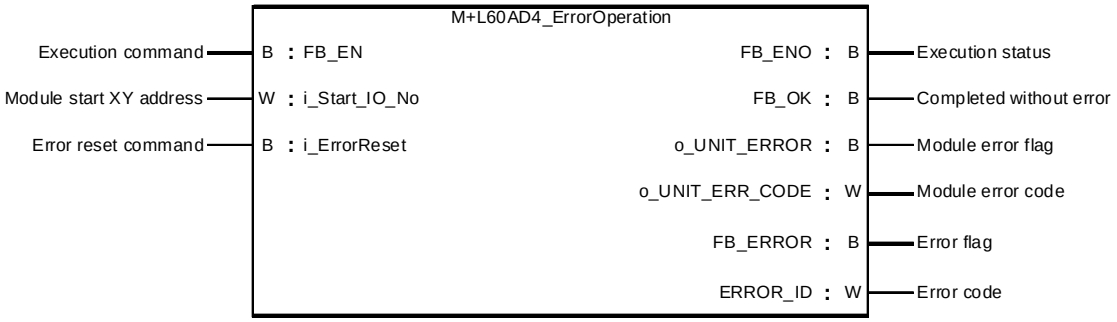
This chapter includes information related to the M+L60AD4_DiffOperation function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

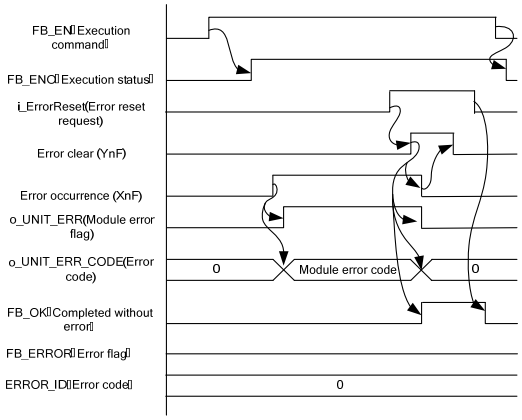
2.16 M+L60AD4_ErrorOperation (Error operation)

FB Name

M+L60AD4_ErrorOperation

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Perform monitoring and reset of intelligent function module error codes</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module.</td><td>L60AD4</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">230 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
<tr><td>Function description</td><td colspan="2">1) By turning on FB_EN (Execution command), the current error code in the target intelligent function module is output.
2) After turning ON FB_EN, the error may be reset by turning ON i_ErrorReset (Error reset command) during the error occurrence.</td></tr>
<tr><td>Compiling method</td><td colspan="2">Macro type</td></tr>
</table>

Item	Description
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 5) Every input must be provided a value for proper FB operation. 6) When this FB is used in two or more places, a duplicated coil warning will occur during compile operation due to the Y signal being operated by index modification. However this is not a problem and the FB will operate without error. 7) The input range settings must be properly configured to match devices connected to the L60AD4 module. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Real-time execution
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] 
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
None	None	None

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted.
Error reset command	i_ErrorReset	Bit	ON, OFF	ON: Turn ON the error clear request of the module. OFF: Turn OFF the error clear request of the module. *After error reset is completed, please turn this input OFF.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the error reset is completed.
Module error flag	o_UNIT_ERR	Bit	OFF	When ON, it indicates the presence of a module error.
Module error code	o_UNIT_ERR_CODE	Word	0	Specified module error code output
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0

FB Version Upgrade History

Version	Date	Description
1.00A	2010/06/28	First edition
1.01B	2012/03/16	Solved the problem that causes the OPERATION ERROR (error code: 4101) when using an index register number that is used by the FB.

Note

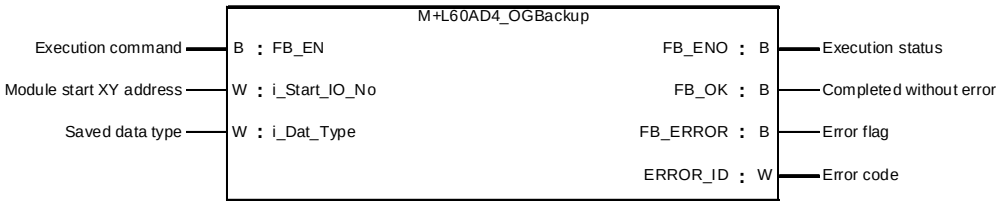
This chapter includes information related to the M+L60AD4_ErrorOperation function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

2.17 M+L60AD4_OGBackup (Offset/gain value save)

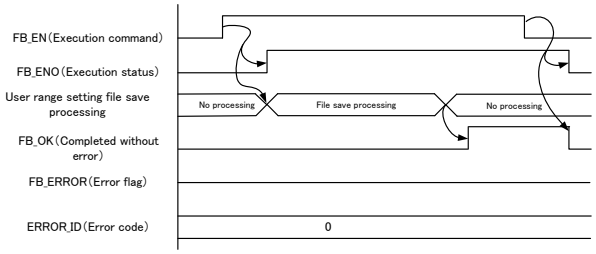
FB name

M+L60AD4_OGBackup

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Read the offset and gain values from the user range setting, and save to file.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module.</td><td>L60AD4</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">452 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) By turning on FB_EN (Execution command), the offset and gain user range settings are read from the CPU module and saved to a file on the SD card. 2) FB operation is one-shot only, triggered by the FB_EN signal. 3) The format for the file name that the FB saves in an SD memory card is "LAD" + "module starting XY address" + ".BIN". [File name example] If the module starting XY address is H0120, the file name is "LAD_0120.BIN". 4) When the FB creates a BIN file in an SD memory card, if the same file is already in the SD memory card, the existing file is replaced by a new file. 5) If the FB is executed without mounting an SD memory card, if the mounted SD memory card does not have sufficient space, or if the number of files that can be saved is exceeded *1, a CPU error *2 occurs. *1 For information on the size of SD memory card and the number of files that can be saved, refer to the LCPU User's Manual (Hardware Design, Maintenance and Inspection). *2 The parameter can be used to set the CPU operation state (continue/stop) for when an access error to SD memory card occurs.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) This FB uses index register Z9. Please do not use Z9 in an interrupt program. 5) With this FB, the user range setting can be saved in an SD memory card only 6) Every input must be provided a value for proper FB operation. 7) The input range settings must be properly configured to match devices connected to the L60AD4 module. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Pulsed execution (multiple scan execution type)
Application example	Refer to "Appendix 1 - FB Library Application examples"

Item	Description
Timing chart	[When operation completes without error] 
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
None	None	None

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted.
Saved data type	i_Dat_Type	Word	0~FH	Please specify each channels data type. 0: Voltage, 1: Current b15 ~ b4 b3 b2 b1 b0 0 ~ 0 CH.4 CH.3 CH.2 CH.1

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the file save is completed.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0

FB Version Upgrade History

Version	Date	Description
1.00A	2010/06/28	First edition
1.01B	2012/03/16	Solved the problem that causes the OPERATION ERROR (error code: 4101) when using an index register number that is used by the FB.

Note

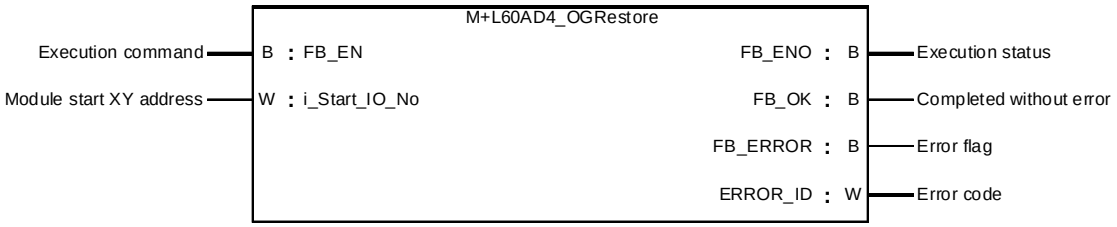
This chapter includes information related to the M+L60AD4_OGBackup function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

2.18 M+L60AD4_OGRestore (Offset/gain value restore)

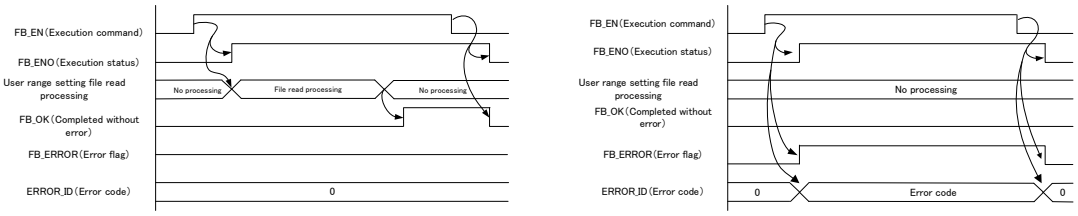
FB Name

M+L60AD4_OGRestore

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Restore the user range offset / gain settings of a module from a file created with M+L60AD4_OGBackup.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module.</td><td>L60AD4</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">434 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) By turning on FB_EN (Execution command), the offset and gain user range settings are read from the CPU module SD memory card and restored to the module. 2) FB operation is one-shot only, triggered by the FB_EN signal. 3) This FB can only be operated when the conversion enable/disable settings of all CH are disabled. 4) Only execute this FB after the M+L60AD4_OGBackup FB has been executed. If a file created with other than M+L60AD4_OGBackup is read, a module error (error code: 163) occurs. 5) The format for the file name that the FB reads from an SD memory card is "LAD" + "module starting XY address" + ".BIN". [File name example] When the module starting XY address is H0120, the file name that is read is "LAD_0120.BIN". 6) If the FB is executed without mounting an SD memory card or if the corresponding user range setting file is not in the SD memory card that is mounted, a CPU error *1 occurs. *1 The parameter can be used to set the CPU operation state (continue/stop) for when an access error to SD memory card occurs.
Compiling method	Macro type
Restrictions and precautions	1) Please only execute this FB after all CH are disabled. 2) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) The FB cannot be used in an interrupt program. 5) This FB uses index register Z9. Please do not use Z9 in an interrupt program. 6) With this FB, a user range setting cannot be restored from a file that is created with other than M+L60AD4_OGBackup. 7) Every input must be provided a value for proper FB operation. 8) The input range settings must be properly configured to match devices connected to the L60AD4 module. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Pulsed execution (multiple scan execution type)
Application example	Refer to "Appendix 1 - FB Library Application examples"

Item	Description
Timing chart	[When operation completes without error] [When an error occurs] 
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
90(Decimal)	The conversion setting of at least one channel is still enabled.	Please try again after confirming the setting.

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the restoration of the offset/gain settings has been completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/06/28	First edition
1.01B	2012/03/16	Solved the problem that causes the OPERATION ERROR (error code: 4101) when using an index register number that is used by the FB.

Note

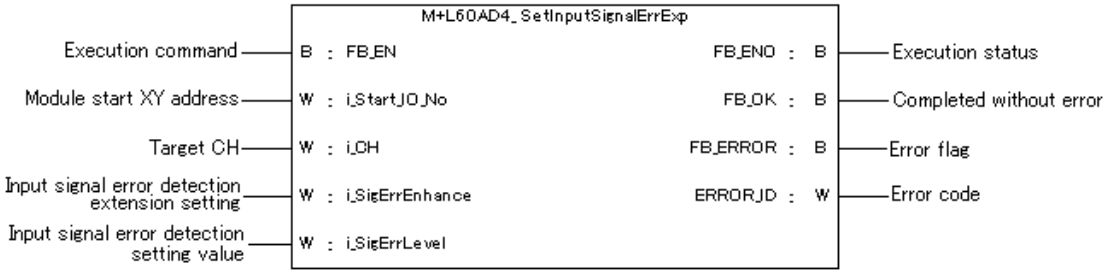
This chapter includes information related to the M+L60AD4_OGRestore function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

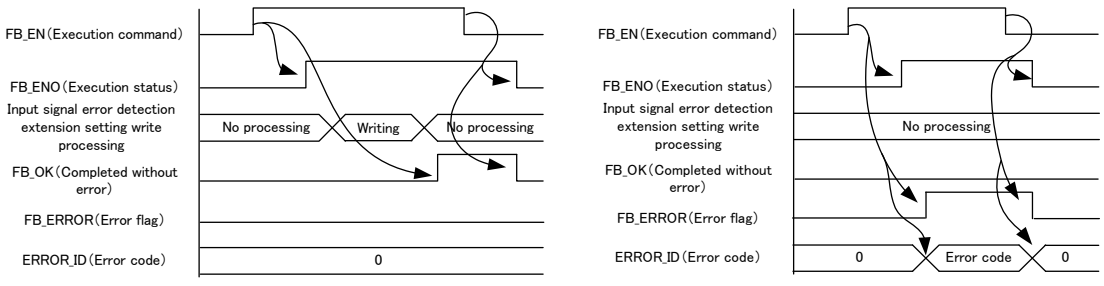
2.19 M+L60AD4_SetInputSignalErrExp (Input signal error detection extension setting)

FB Name

M+L60AD4_SetInputSignalErrExp

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Set the input signal error detection extension setting of a specified channel.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module</td><td>L60AD4
* Applicable to A/D converter modules whose first five digits of serial number is 13041 or later only</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">294 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) Performs the input signal error detection extension setting of a specified channel when the FB_EN (Execution command) signal is turned ON. 2) FB operation is one-shot only, triggered by the FB_EN signal. 3) The new setting value will not take effect until the 'operation condition setting request' signal (Yn9) is turned (OFF->ON->OFF) or the Operation condition setting request FB (M+L60AD4_RequestSetting) is executed. 4) When the target CH setting value is out of range, the FB_ERROR output turns on, processing is interrupted, and the error code is stored in ERROR_ID. Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target CH. 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) If the parameter is set using the configuration function of GX Works 2, using this FB is unnecessary. 8) The input range settings must be properly configured to match devices connected to the L60AD4 module. Configure the settings according to the application by using the switch settings of GX Works2. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Pulsed execution (1 scan execution type)
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] [When an error occurs] 

Item	Description
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10(Decimal)	The specified target channel is not valid. The target channel is not within the range of 1 to 4.	Please try again after confirming the setting.
11(Decimal)	The input signal error detection extension setting is not valid. The input signal error detection extension setting is not within the range of 0 to 4.	Please try again after confirming the setting.

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON,OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted. (For example, enter H10 for X10.)
Target CH	i_CH	Word	1~4	Specify the CH number.
Input signal error detection extension setting	i_SigErrEnhance	Word	0H: Disable 1H: Upper lower limit detection 2H: lower limit detection 3H: Upper limit detection 4H: Disconnection detection	Set the input signal error detection extension setting.

Name (comment)	Label name	Data type	Setting range	Description
Input signal error detection setting value	i_SigErrLevel	Word	0~250 (Unit: 0.1%)	Set the input signal error detection setting value.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that input signal error detection extension setting is completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2012/03/16	First edition

Note

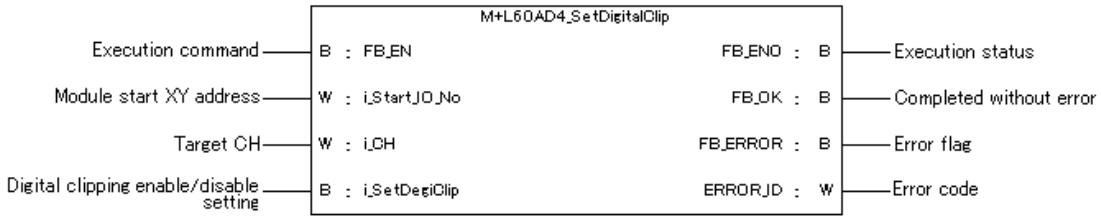
This chapter includes information related to the M+L60AD4_SetInputSignalErrExp function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

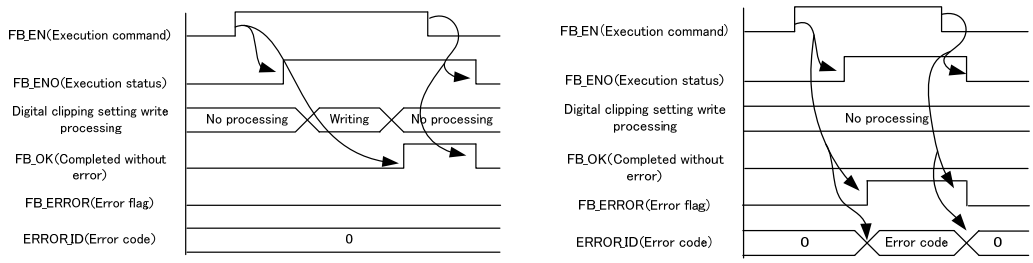
2.20 M+L60AD4_SetDigitalClip (Digital clipping setting)

FB Name

M+L60AD4_SetDigitalClip

Function Overview

<table>
<tr><td>Item</td><td colspan="2">Description</td></tr>
<tr><td>Function overview</td><td colspan="2">Enable or disable the digital clipping of a specified channel.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module</td><td>L60AD4
* Applicable to A/D converter modules whose first five digits of serial number is 13041 or later only</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">221 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) Enable or disable the digital clipping of a specified channel when the FB_EN (Execution command) signal is turned ON. 2) FB operation is one-shot only, triggered by the FB_EN signal. 3) The new setting value will not take effect until the 'operation condition setting request' signal (Yn9) is turned (OFF->ON->OFF) or the Operation condition setting request FB (M+L60AD4_RequestSetting) is executed. 4) When the target CH setting value is out of range, the FB_ERROR output turns on, processing is interrupted, and the error code is stored in ERROR_ID. Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 5) Every input must be provided a value for proper FB operation. 6) If the parameter is set using GX Configurator-AD or the configuration function of GX Works 2, using this FB is unnecessary. 7) The input range settings must be properly configured to match devices connected to the L60AD4 module. Configure the settings according to the application by using the switch settings of GX Works2. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Pulsed execution (1 scan execution type)
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] [When an error occurs] 

Item	Description
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10(Decimal)	The specified target channel is not valid. The target channel is not within the range of 1 to 4.	Please try again after confirming the setting.

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON,OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted. (For example, enter H10 for X10.)
Target CH	i_CH	Word	1~4	Specify the CH number.
Digital clipping enable/disable setting	i_SetDegiClip	Bit	ON, OFF	ON: Enable the digital clipping function. OFF: Disable the digital clipping function.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the digital clipping enable/disable setting is completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2012/03/16	First edition

Note

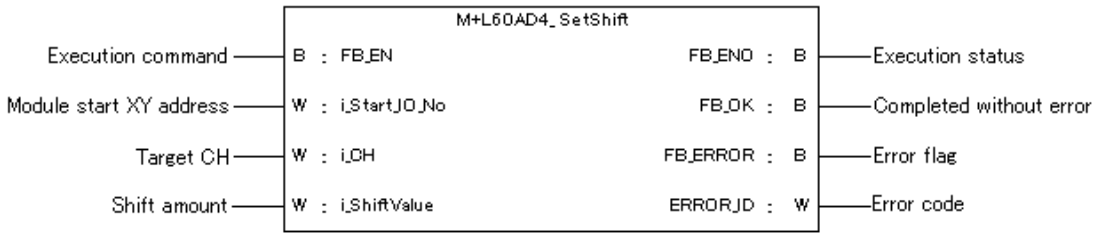
This chapter includes information related to the M+L60AD4_SetDigitalClip function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

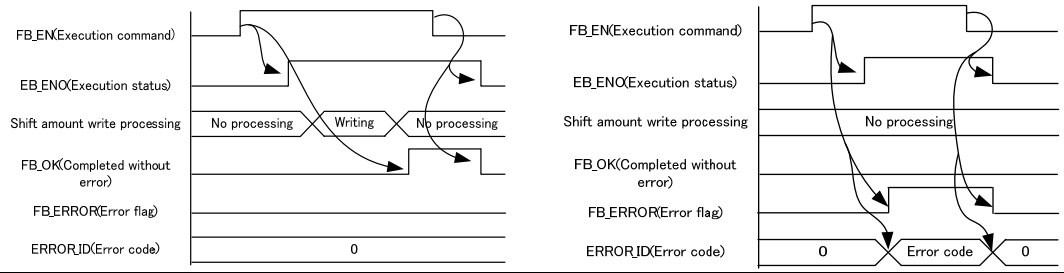
2.21 M+L60AD4_SetShift (Shift setting)

FB Name

M+L60AD4_SetShift

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Perform the shift setting of a specified channel.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module</td><td>L60AD4
* Applicable to A/D converter modules whose first five digits of serial number is 13041 or later only</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">204 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) Performs the shift setting of a specified channel when the FB_EN (Execution command) signal is turned ON. 2) FB operation is one-shot only, triggered by the FB_EN signal. 3) When the target CH setting value is out of range, the FB_ERROR output turns on, processing is interrupted, and the error code is stored in ERROR_ID. Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target CH. 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) If the parameter is set using the configuration function of GX Works 2, using this FB is unnecessary. 8) The input range settings must be properly configured to match devices connected to the L60AD4 module. Configure the settings according to the application by using the switch settings of GX Works2. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Pulsed execution (1 scan execution type)
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] [When an error occurs] 
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10(Decimal)	The specified target channel is not valid. The target channel is not within the range of 1 to 4.	Please try again after confirming the setting.

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON,OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted. (For example, enter H10 for X10.)
Target CH	i_CH	Word	1~4	Specify the CH number.
Shift amount	i_ShiftValue	Word	-32,768~32,767	Specify the shift amount.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the shift setting is completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2012/03/16	First edition

Note

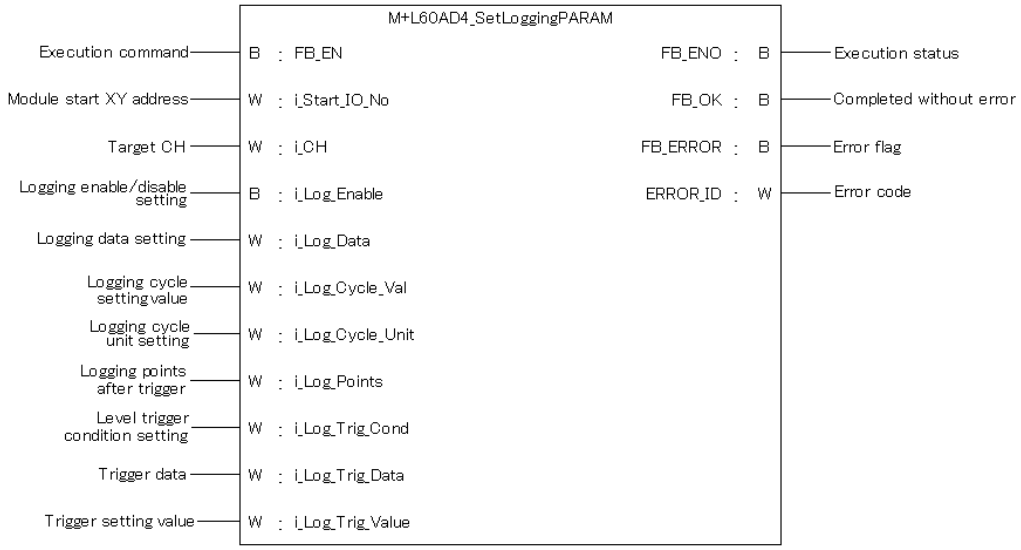
This chapter includes information related to the M+L60AD4_SetShift function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

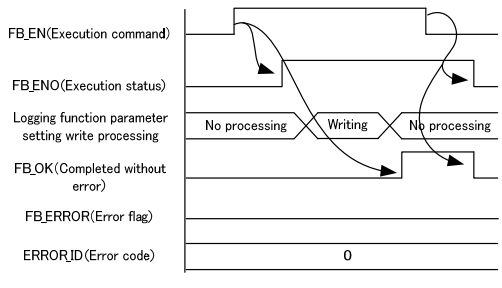
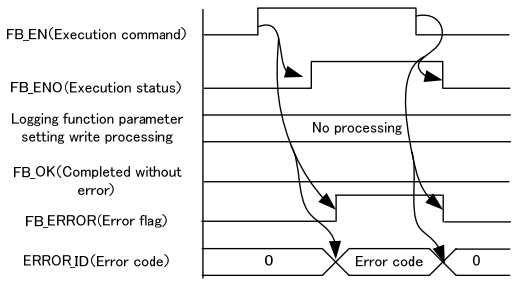
2.22 M+L60AD4_SetLoggingPARAM (Logging function parameter setting)

FB Name

M+L60AD4_SetLoggingPARAM

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Perform the logging function of a specified channel.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module</td><td>L60AD4
* Applicable to A/D converter modules whose first five digits of serial number is 13041 or later only</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">301 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) Sets the logging function of a specified channel when the FB_EN (Execution command) signal is turned ON. 2) FB operation is one-shot only, triggered by the FB_EN signal. 3) The new setting value will not take effect until the 'operation condition setting request' signal (Yn9) is turned (OFF->ON->OFF) or the Operation condition setting request FB (M+L60AD4_RequestSetting) is executed. 4) When the target CH setting value is out of range, the FB_ERROR output turns on, processing is interrupted, and the error code is stored in ERROR_ID. Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target CH. 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) If the parameter is set using the configuration function of GX Works 2, using this FB is unnecessary. 8) The input range settings must be properly configured to match devices connected to the L60AD4 module. Configure the settings according to the application by using the switch settings of GX Works2. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation Type	Pulsed execution (1 scan execution type)
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] [When an error occurs]  

Item	Description
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10(Decimal)	The specified target channel is not valid. The target channel is not within the range of 1 to 4.	Please try again after confirming the setting.

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON,OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted. (For example, enter H10 for X10.)
Target CH	i_CH	Word	1~4	Specify the CH number.
Logging enable/disable setting	i_Log_Enable	Bit	ON,OFF	ON: Enable the logging function. OFF: Disable the logging function.
Logging data setting	i_Log_Data	Word	0: Digital output value 1: Scaling value (digital operation value)	Set the data to be logged.

Name (comment)	Label name	Data type	Setting range	Description
Logging cycle setting value	i_Log_Cycle_Val	Word	1) Logging cycle unit setting= 0: 80~32,767 2) Logging cycle unit setting= 1: 1~32,767 3) Logging cycle unit setting= 2: 1~3,600	Set the cycle to store data.
Logging cycle unit setting	i_Log_Cycle_Unit	Word	0: µs 1: ms 2: s	Specify the cycle unit to store data.
Logging points after trigger	i_Log_Points	Word	1~10,000	Specify the number of data to be logged after the hold trigger occurs.
Level trigger condition setting	i_Log_Trig_Cond	Word	0: Disable 1: Above 2: Below 3: Pass through	Set whether to use the level trigger or not. If used, set the condition.
Trigger data	i_Log_Trig_Data	Word	0~4,999	Set the buffer memory address monitored for the level trigger.
Trigger setting value	i_Log_Trig_Value	Word	-32,768~32,767	Set the level at which the level trigger occurs.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the logging function parameter setting is completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2012/03/16	First edition

Note

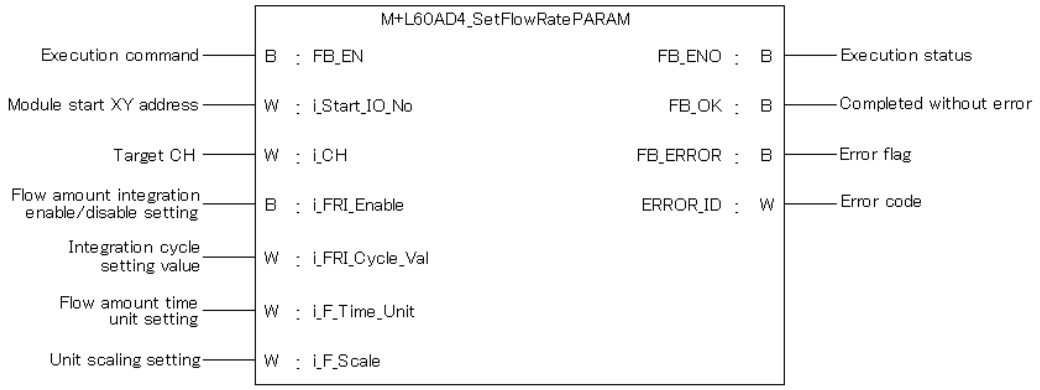
This chapter includes information related to the M+L60AD4_SetLoggingPARAM function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

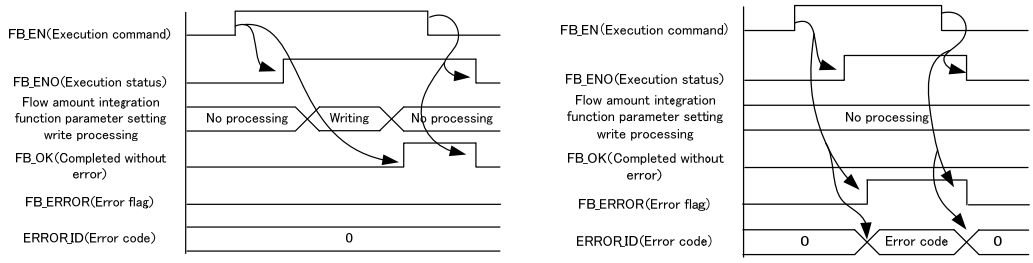
2.23 M+L60AD4_SetFlowRatePARAM (Flow amount integration function parameter setting)

FB Name

M+L60AD4_SetFlowRatePARAM

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Set the flow amount integration function of a specified channel.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module</td><td>L60AD4
* Applicable to A/D converter modules whose first five digits of serial number is 13041 or later only</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">293 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) Sets the flow amount integration function of a specified channel when the FB_EN (Execution command) signal is turned ON. 2) FB operation is one-shot only, triggered by the FB_EN signal. 3) The new setting value will not take effect until the 'operation condition setting request' signal (Yn9) is turned (OFF->ON->OFF) or the Operation condition setting request FB (M+L60AD4_RequestSetting) is executed. 4) When the target CH setting value is out of range, the FB_ERROR output turns on, processing is interrupted, and the error code is stored in ERROR_ID. Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target CH. 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) If the parameter is set using the configuration function of GX Works 2, using this FB is unnecessary. 8) The input range settings must be properly configured to match devices connected to the L60AD4 module. Configure the settings according to the application by using the switch settings of GX Works2. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Pulsed execution (1 scan execution type)
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] [When an error occurs] 

Item	Description
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10(Decimal)	The specified target channel is not valid. The target channel is not within the range of 1 to 4.	Please try again after confirming the setting.

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON,OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted. (For example, enter H10 for X10.)
Target CH	i_CH	Word	1~4	Specify the CH number.
Flow amount integration enable/disable setting	i_FRI_Enable	Bit	ON, OFF	ON: Enable the flow amount integration function. OFF: Disable the flow amount integration function.
Integration cycle setting value	i_FRI_Cycle_Val	Word	1~5,000 (ms)	Set the integration cycle value of the connected flow meter. The unit is ms. Match the analog output cycle of the connected flow meter.
Flow amount time unit setting	i_F_Time_Unit	Word	0: /s 1: /min 2: /h	Set the range (time unit) of the flow meter.

Name (comment)	Label name	Data type	Setting range	Description
Unit scaling setting	i_F_Scale	Word	0: ×1 1: ×10 2: ×100 3: ×1,000 4: ×10,000	Specify the unit scale to calculate the integrated flow amount.

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the flow amount integration function parameter setting is completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2012/03/16	First edition

Note

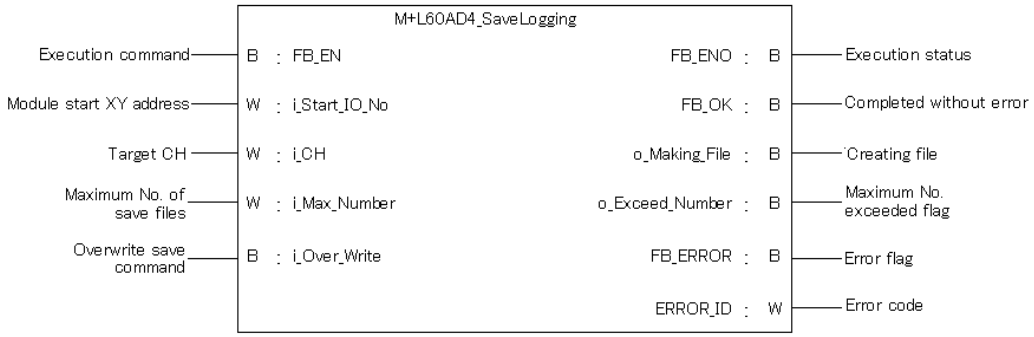
This chapter includes information related to the M+L60AD4_SetFlowRatePARAM function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

2.24 M+L60AD4_SaveLogging (Logging data save)

FB Name

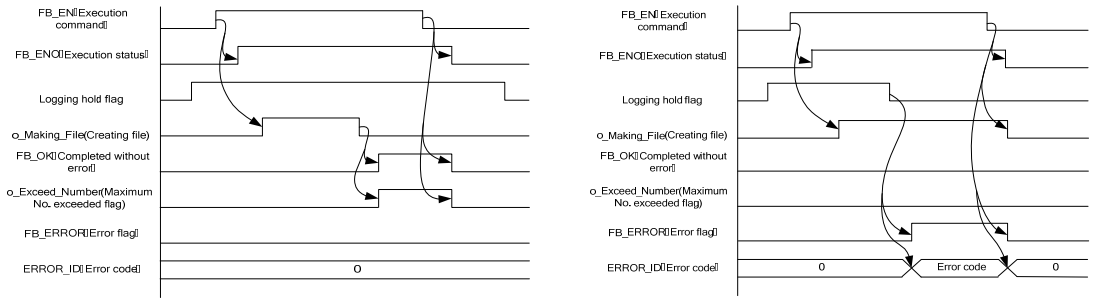
M+L60AD4_SaveLogging

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Save the logging data of a specified channel in a file.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module</td><td>L60AD4
* Applicable to A/D converter modules whose first five digits of serial number is 13041 or later only</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">1766 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) When FB_EN (Execution command) and the logging hold flag are turned ON, the logging data from the start pointer for the number of the logging data are sorted chronologically. Then, the logging data and the trigger occurrence information are saved in CSV format in the SD memory card mounted on the CPU. 2) When FB_EN is ON, the FB starts the save processing of the logging data each time the logging hold flag is turned ON. 3) It requires multiple scans to complete the save processing of the logging data. To check whether it is completed, check FB_OK (Completed without error). 4) The format for the file name that the FB saves in an SD memory card is "AD" + "second and third digits of the module starting XY address that is expressed in 4 digits" + "Target channel" + "serial number" +" .CSV". The maximum serial number depends on i_Max_Number (Maximum No. of save files). If FB_EN is turned OFF, the serial number is reset and the serial number starts from 1 again. [File name example] The file name is "AD453006.CSV" in the following case. The module starting XY address is H0450, the target channel is 3, i_Max_Number (Maximum No. of save files) is 30, and the number of files this FB created is 6. 5) When the FB creates a CSV file in an SD card, if the same file name is already in the SD memory card, the existing file is replaced by a new file. 6) If i_Over_Write (Overwrite save command) is turned ON and the number of files the FB saved in the SD memory card has exceeded i_Max_Number, the serial number returns to 1 and the FB continues to perform the save processing of the logging data. 7) If i_Over_Write is turned OFF and the number of files saved in the SD memory card has reached i_Max_Number, the FB stops the save processing of the logging data. 8) If the number of files the FB saved in the SD memory card has reached i_Max_Number, o_Exceed_Number (Maximum No. reached flag) is turned ON regardless of whether i_Over_Write is ON or OFF. 9) If there is an incorrect input in i_CH (Target CH) or i_Max_Number, FB_ERROR (Error flag) is turned ON and the FB processing is aborted. Then an error code is stored in ERROR_ID (error code).

Item	Description
	10) If the FB is executed without mounting an SD memory card, if the mounted SD memory card does not have sufficient space, or if the number of files that can be saved is exceeded *1, a CPU error *2 occurs. When an error causes a stop error in the CPU module, FB_ERROR or ERROR_ID is not updated. When an error causes a continuation error in the CPU module, FB_ERROR is turned ON and an error code is stored in ERROR_ID. 11) For information on the format of the CSV file the FB creates, refer to MELSEC-L Analog-Digital Converter Module User's Manual. *1 For information on the size of SD memory card and the number of files that can be saved, refer to LCPU User's Manual (Hardware Design, Maintenance and Inspection). *2 The parameter can be used to set the CPU operation state (continue/stop) for when an access error to SD memory card occurs.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) This FB uses index registers, Z6, Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 5) This FB can save logging data in an SD memory card only. 6) This FB uses a SP.FWRITE instruction. Therefore, if an error occurs during execution of the SP.FWRITE instruction, a CPU error occurs. 7) When two or more of these FBs are used, implement an interlock to prevent them from being executed simultaneously. [Interlock example] When the target channels are set to channels 1 and 2 and their logging data are saved, confirm that FB_OK for channel 1 is turned ON before turning ON EB_EN for channel 2. 8) It is not possible to save logging data if SM606 (SD memory card forced disable Instruction) is turned ON while the logging data is being saved. In this case, FB_ERROR is turned ON and an error code is stored in ERROR_ID. 9) Every input must be provided a value for proper FB operation.

Item	Description
	10) Pay attention to the size of the SD memory card and the number of files that can be saved when determining i_Max_Number (Maximum No. of save files). If the size of the SD memory card or the number of files that can be saved is exceeded when this FB is executed, a CPU error occurs. For information on the size of SD memory card and the number of files that can be saved, refer to LCPU User's Manual (Hardware Design, Maintenance and Inspection). 11) The input range settings must be properly configured to match devices connected to the L60AD4 module. Configure the settings according to the application by using the switch settings of GX Works2. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Pulsed execution (multiple scan execution type)
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] [When an error occurs] 
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10(Decimal)	The specified target channel is not valid. The target channel is not within the range of 1 to 4.	Please try again after confirming the setting.
11 (Decimal)	The maximum number of save files is not valid. The maximum number of save files is not within the range of 1 to 999.	Please try again after confirming the setting.

Error code	Description	Action
20 (Decimal)	The processing is aborted because the logging hold flag is turned OFF while the logging data is being saved. An incomplete CSV file is saved in the SD memory card.	-
21 (Decimal)	It is not possible to access to the SD memory card because SM606 (SD memory card forced disable Instruction) is turned ON. If SM606 (SD memory card forced disable Instruction) is turned ON while the logging data is being saved, an incomplete CSV file is saved in the SD memory card. Turn OFF SM606 and confirm that SM607 (SD memory card forced disable status flag) is turned OFF. Then, execute the FB again.	Turn OFF SM606 and confirm that SM607 (SD memory card forced disable status flag) is turned OFF. Then, execute the FB again.
Error codes other than above	-	For details on the error codes for errors occurring, refer to Appendix 1 Error Code List in the MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection).

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON,OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted. (For example, enter H10 for X10.)
Target CH	i_CH	Word	1~4	Specify the CH number.
Maximum No. of save files	i_Max_Number	Word	1~999	Specify the maximum number of CSV files the FB saves.

Name (comment)	Label name	Data type	Setting range	Description
Overwrite save command	i_Over_Write	Bit	ON,OFF	Set whether to overwrite a CSV file with the youngest serial number when the number of CSV files saved by this FB exceeds the maximum number of save files. (When OFF, the save processing of logging data stops.)

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the file saving is completed. Turned OFF when the logging resumes.
Creating file	o_Making_File	Bit	OFF	When ON, it indicates that a file is being created.
Maximum No. exceeded flag	o_Exceed_Number	Bit	OFF	When ON, it indicates that the number of CSV files saved by this FB has reached the maximum number of save files.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2012/03/16	First edition

Note

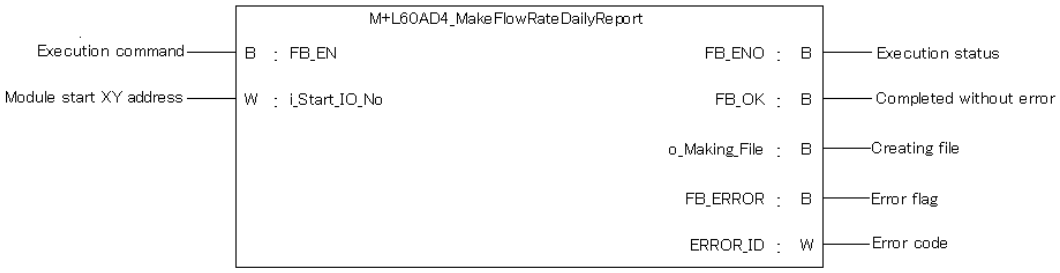
This chapter includes information related to the M+L60AD4_SaveLogging function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

2.25 M+L60AD4_MakeFlowRateDailyReport (Flow amount daily report creation)

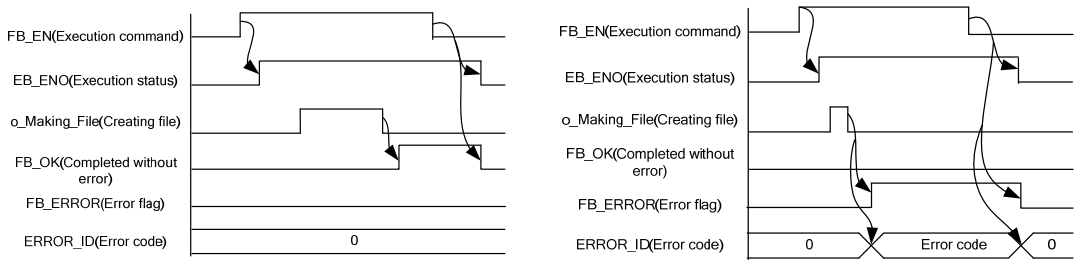
FB Name

M+L60AD4_MakeFlowRateDailyReport

Function Overview

<table>
<tr><td>Item</td><td colspan="2">Description</td></tr>
<tr><td>Function overview</td><td colspan="2">Save the flow amount daily report data of all channels in a file.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Analog-Digital converter module</td><td>L60AD4
* Applicable to A/D converter modules whose first five digits of serial number is 13041 or later only</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">1602 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) By turning ON FB_EN (Execution command), the "flow amount per hour" that flows on the hour for 24 hours and the "total flow amount of the day" are calculated based on the integrated flow amount (Un\G1332~Un\G1339) of the L60AD4. Then, they are saved in a flow amount daily report file in CSV format. The flow amount daily report is saved in an SD memory card mounted on the CPU module. 2) When FB_EN is ON, a flow amount daily report is created at 12 am every day. The process to create a flow amount daily report starts when the FB detects the change from 11 pm to 12 am. 3) It requires multiple scans to complete the save processing of the flow amount daily report data. o_Making_File (Creating file) is turned ON while the flow amount daily report data is being saved. 4) By executing a single FB, a flow amount daily report for all channels of a module can be created. 5) The format for the file name that the FB saves in an SD memory card is "second and third digits of the module starting XY address that is expressed in 4 digits" + "lower two digits of the year the daily report is created " + "month and day the daily report is created" +" .CSV". [File name example] The file name is "45110601.CSV" when the module starting XY address is H0450 and the daily report was created on June 1, 2011. 6) When the FB creates a CSV file in an SD memory card, if the same file is already in the SD memory card (e.g. the clock information of the CPU is changed), the existing file is replaced by a new file. 7) If the FB is executed without mounting an SD memory card, if the mounted SD memory card does not have sufficient space, or if the number of files that can be saved is exceeded *1, a CPU error *2 occurs. When an error causes a stop error in the CPU module, FB_ERROR or ERROR_ID is not updated. When an error causes a continuation error in the CPU module, FB_ERROR is turned ON and an error code is stored in ERROR_ID. 8) For information on the format of the CSV file the FB creates, refer to MELSEC-L Analog-Digital Converter Module User's Manual. *1 For information on the size of SD memory card and the number of files that can be saved, refer to LCPU User's Manual (Hardware Design, Maintenance and Inspection). *2 The parameter can be used to set the CPU operation state (continue/stop) for when an access error to SD memory card occurs.
Compiling method	Macro type

Item	Description
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) This FB uses index registers Z8, and Z9. Please do not use these index registers in an interrupt program. 5) This FB can save flow amount daily report data in an SD memory card only. 6) This FB uses a SP.FWRITE instruction. Therefore, if an error occurs during execution of the SP.FWRITE instruction, a CPU error occurs. 7) If SM606 (SD memory card forced disable Instruction) is turned ON while the flow amount daily report data is being saved, it is not possible to execute the SP.FWRITE instruction. Therefore, the flow amount daily report data cannot be saved. In this case, FB_ERROR is turned ON and an error code is stored in ERROR_ID. 8) This FB uses the clock information of the CPU to calculate the "flow amount per hour" and "total flow amount of the day". If the clock information of the CPU is changed while this FB is being performed, the processing to create a flow amount daily report may not be performed normally. 9) Every input must be provided a value for proper FB operation. 10) If the size of SD memory card or the number of files that can be saved is exceeded by executing this FB, a CPU error occurs. For information on the size of SD memory card and the number of files that can be saved, refer to LCPU User's Manual (Hardware Design, Maintenance and Inspection). 11) The input range settings must be properly configured to match devices connected to the L60AD4 module. Configure the settings according to the application by using the switch settings of GX Works2. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Real-time execution
Application example	Refer to "Appendix 1 - FB Library Application examples"
Timing chart	[When operation completes without error] [When an error occurs] 

Item	Description
Relevant manuals	MELSEC-L Analog-Digital Converter Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
21 (Decimal)	It is not possible to access to the SD memory card because SM606 (SD memory card forced disable Instruction) is turned ON. If SM606 (SD memory card forced disable Instruction) is turned ON while the flow amount daily report data is being saved, an incomplete CSV file is saved in the SD memory card.	Turn OFF SM606 and confirm that SM607 (SD memory card forced disable status flag) is turned OFF. Then, execute the FB again.
Error codes other than above	-	For details on the error code for errors occurring, refer to Appendix 1 Error Code List in the MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection).

Labels

●Input labels

Name (comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON,OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60AD4 module is mounted. (For example, enter H10 for X10.)

●Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the creation of the flow amount daily report is completed.
Creating file	o_Making_File	Bit	OFF	When ON, it indicates that a file is being created.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2012/03/16	First edition

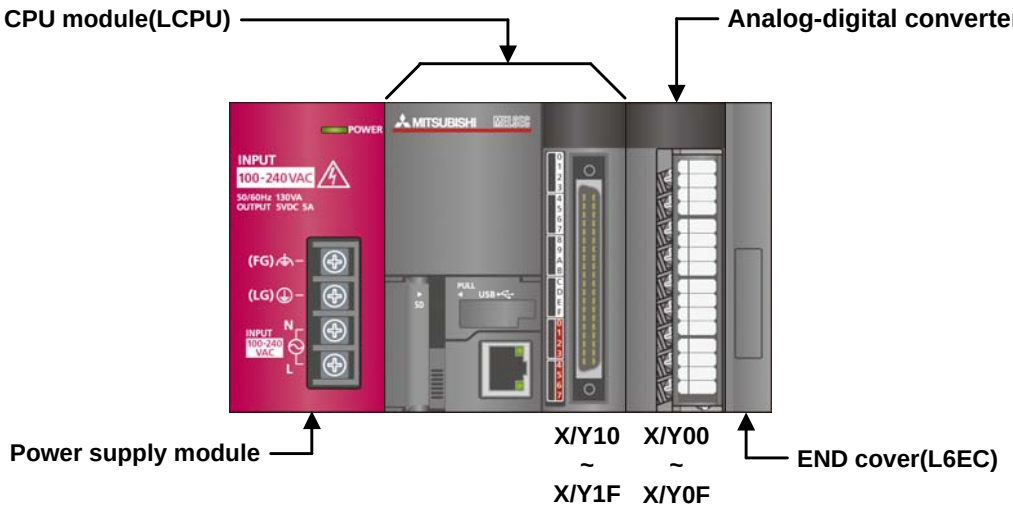
Note

This chapter includes information related to the M+L60AD4_MakeFlowRateDailyReport function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

Appendix 1. FB Library Application examples

L60AD4 FB application example

System configuration



Reminder

- Every input must be provided with a value for proper FB operation.
  If not set, the values will be unspecified.
- Abbreviations may be used in the label comments due to the limitation on the number of the characters to display in GX Works2.

List of devices

External input (commands)

Device	FB function name	Application(ON details)
M0	Read AD conversion data	AD value reading request
M10	Read all AD conversion data	AD value reading all CHs request
M20	Read scaling value	Scaling value reading request
M30	Read all scaling values	Scaling value reading request
M40	Conversion speed setting	Change speed settings request
M50	Enable/disable AD conversion	AD enable/disable request
M51		AD enable/disable setting
M60	Averaging process setting	Averaging specification request
M70	Scaling setting	Scaling setting request
M71		Scaling enable:ON/disable:OFF
M80	Process alarm setting	Process alarm setting request
M81		Process alarm enable/disable
M90	Input signal error detection setting	Input signal error setting req
M91		Input signal error enable/disabl
M100	Operation condition setting request	Operation condition setting req
M110	Offset setting	Offset setting request
M111		Offset value writing request
M120	Gain setting	Gain setting request
M121		Gain value writing request
M130	Shift operation	Shift operation request
M140	Differential conversion process	Diff conversion proc start req
M150	Error operation	Error operation request
M151		Error reset request
M160	Offset/gain value save	Offset/gain save file request
M170	Offset/gain value restore	Offset/gain restore request
M180	Input signal error detection extension setting	Input signal err ext setting req
M190	Digital clipping setting	Digital clipping setting request
M191		Digital clipping enable/disable
M200	Shift setting	Shift setting request
M210	Logging function parameter setting	Logging fnc param setting req
M211		Log fnc param enable/disable set
M220	Flow amount integration function parameter setting	Flow amount int param set req
M221		Flow amount int param en/disable
M230	Logging data save	Logging data save request
M231		Log file overwrite en/disable
M240	Flow amount daily report creation	Flow amount daily rpt create req

Data register

Device	FB function name	Application(ON details)
D0	Read AD conversion data	AD conversion data
D1		AD value reading FB error code
D10	Read all AD conversion data	CH1 AD conversion data
D11		CH2 AD conversion data
D12		CH3 AD conversion data
D13		CH4 AD conversion data
D20	Read scaling value	Scaling value
D21		Scaling value read FB err code
D30	Read all scaling values	CH1 scaling value
D31		CH2 scaling value
D32		CH3 scaling value
D33		CH4 scaling value
D50	Enable/disable AD conversion	AD enable/disable FB error code
D60	Averaging process setting	Averaging process FB error code
D70	Scaling setting	Scaling setting FB error code
D80	Process alarm setting	Process alarm set FB error code
D90	Input signal error detection setting	Input signal setting FB err code
D110	Offset setting	Offset setting FB error code
D120	Gain setting	Gain setting FB error code
D130	Shift operation	Digital value
D131		Shift amount
D140	Differential conversion process	Digital value
D141		Differential conversion value
D142		Differential conversion standard
D150	Error operation	Module error code
D170	Offset/gain value restore	Offset/gain restore FB err code
D180	Input signal error detection extension setting	Input signal ext set FB err code
D190	Digital clipping setting	Digital clip setting FB err code
D200	Shift setting	Shift setting FB error code
D210	Logging function parameter setting	Log fnc param set FB err code
D220	Flow amount integration function parameter setting	Flow amt int param FB error code
D230	Logging data save	Logging data save FB error code
D240	Flow amount daily report creation	Flow amt daily rpt FB error code

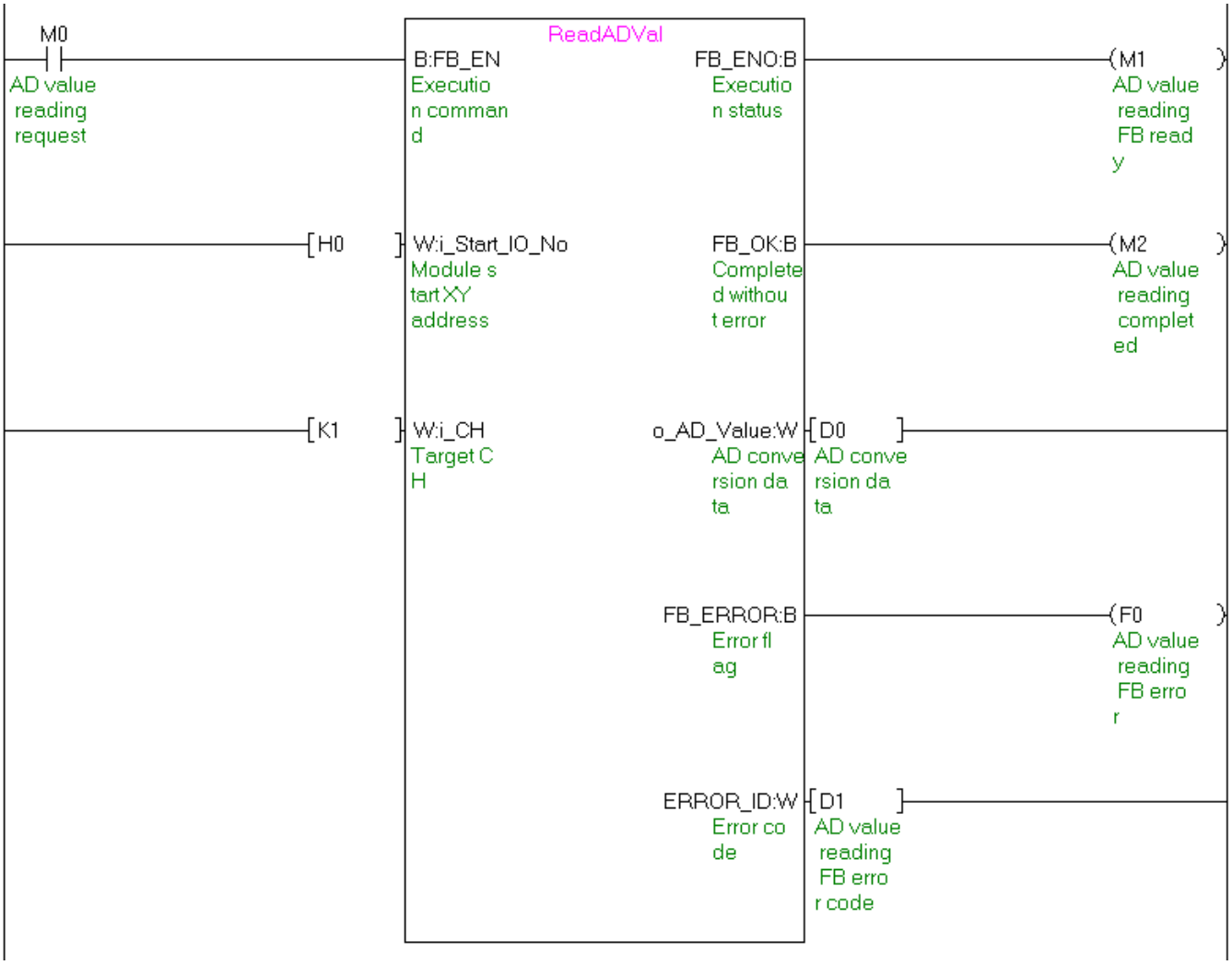
External output (checks)

Device	FB function name	Application(ON details)
M1	Read AD conversion data	AD value reading FB ready
M2		AD value reading completed
F0		AD value reading FB error
M11	Read all AD conversion data	AD value reading FB all
M12		AD value reading completion all
M21	Read scaling value	Scaling value reading FB ready
M22		Scaling value reading complete
F5		Scaling value reading FB error
M31	Read all scaling values	Scaling value reading FB ready
M32		Scaling value reading complete
M41	Conversion speed setting	Change speed setting FB ready
M42		Change speed setting complete
M52	Enable/disable AD conversion	AD enable/disable setting ready
M53		AD enable/disable request
F10		AD enable/disable FB error
M61	Averaging process setting	Averaging specification FB ready
M62		Averaging proc setting complete
F15		Averaging process FB error
M72	Scaling setting	Scaling setting FB ready
M73		Scaling setting complete
F20		Scaling setting FB error
M82	Process alarm setting	Process alarm setting FB ready
M83		Process alarm setting complete
F25		Process alarm setting FB error
M92	Input signal error detection setting	Input signal error setting ready
M93		Input signal error setting comp
F30		Input signal setting FB error
M101	Operation condition setting request	Operate condition setting ready
M102		Operating condition setting comp
M112	Offset setting	Offset setting FB ready
M113		Offset setting complete
F35		Offset setting FB error
M122	Gain setting	Gain setting FB ready
M123		Gain setting complete
F40		Gain setting FB error
M131	Shift operation	Shift operation FB ready
M132		Shift operation complete
M141	Differential conversion process	Diff conversion proc FB ready
M142		Diff conversion process complete
M152	Error operation	Error operation ready
M153		Error operation complete
F45		Module error flag
M161	Offset/gain value save	Offset/gain save file ready
M162		Offset/gain save file comp
M171	Offset/gain value restore	Offset/gain value restore ready
M172		Offset/gain value restore comp
F50		Offset/gain value restore FB err
M181	Input signal error detection extension setting	Input signal error ext set ready
M182		Input signal error ext set comp
F55		Input signal ext set FB error
M192	Digital clipping setting	Digital clipping setting ready
M193		Digital clipping set complete
F60		Digital clipping setting FB err
M201	Shift setting	Shift setting ready
M202		Shift setting complete
F65		Shift setting FB error
M212	Logging function parameter setting	Logging fnc param setting ready
M213		Logging fnc param set complete
F70		Logging fnc param setting FB err
M222	Flow amount integration function parameter setting	Flow amount int param set ready
M223		Flow amount int param set comp
F75		Flow amount int param set FB err
M232	Logging data save	Logging data save ready
M233		Logging data save complete
M234		Logging data saving
M235		Logging file max No. reached
F80		Logging data save FB error
M241	Flow amount daily report creation	Flow amt daily rpt create ready
M242		Flow amt daily rpt create comp
M243		Flow amt daily report creating
F85		Flow amount daily report FB err

M+L60AD4_ReadADVal (Read AD conversion data)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.
i_CH	K1	Set the target channel to channel 1.

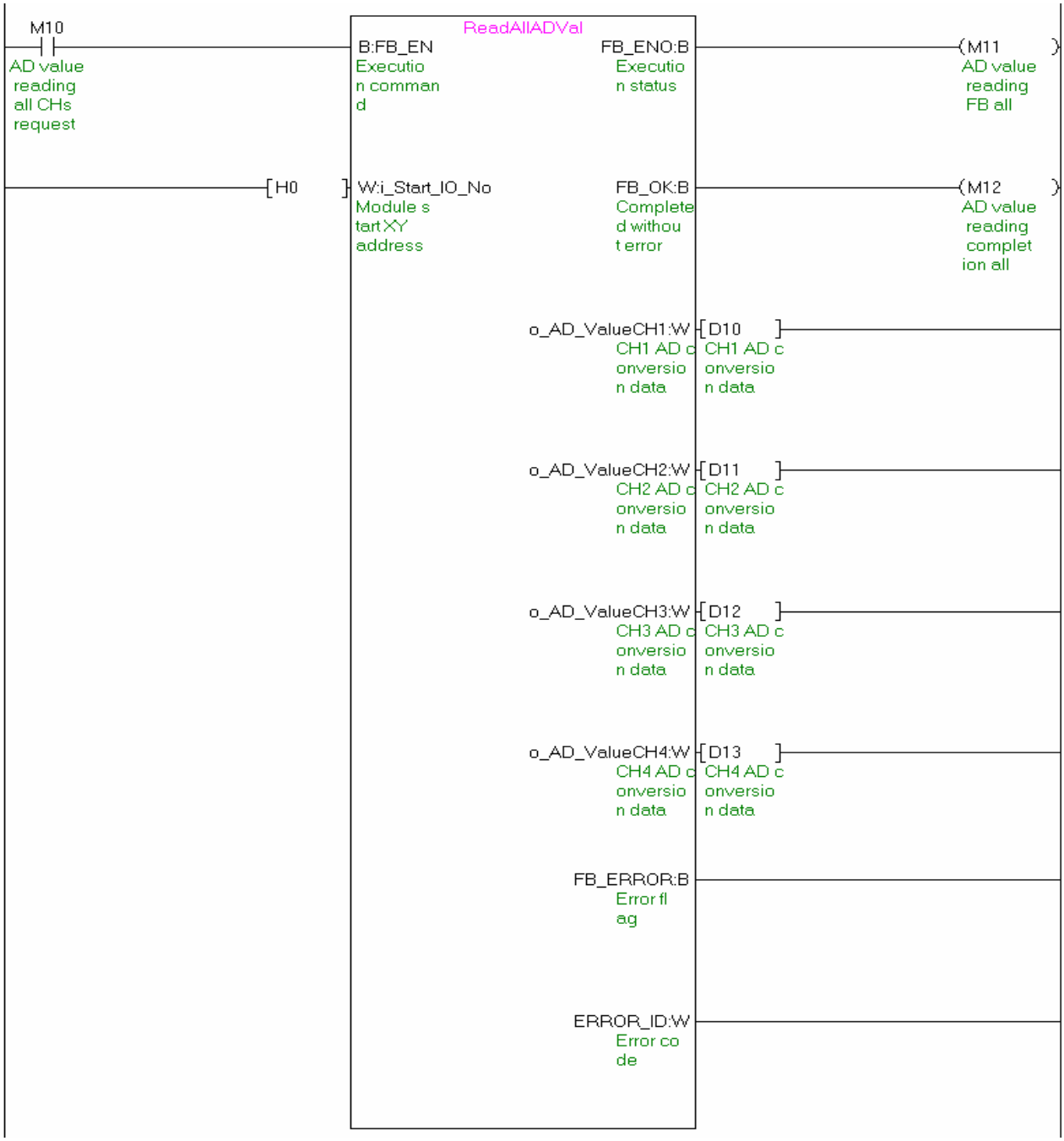
By turning ON M0, the AD conversion data of channel 1 is read.



M+L60AD4_ReadAllADVal (Read all AD conversion data)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.

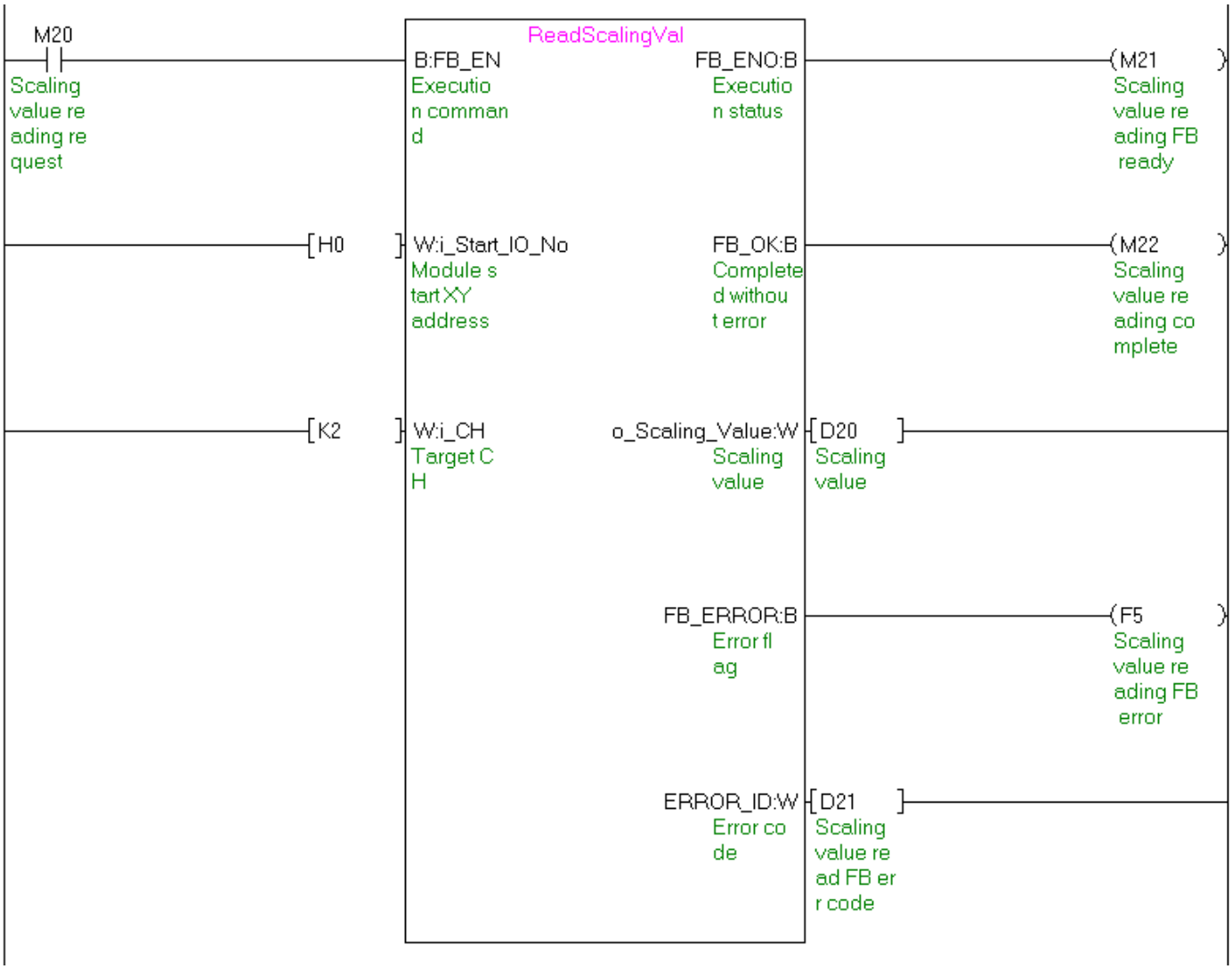
By turning ON M10, AD conversion data of all channels are read.



M+L60AD4_ReadScalingVal (Read scaling value)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.
i_CH	K2	Set the target channel to channel 2.

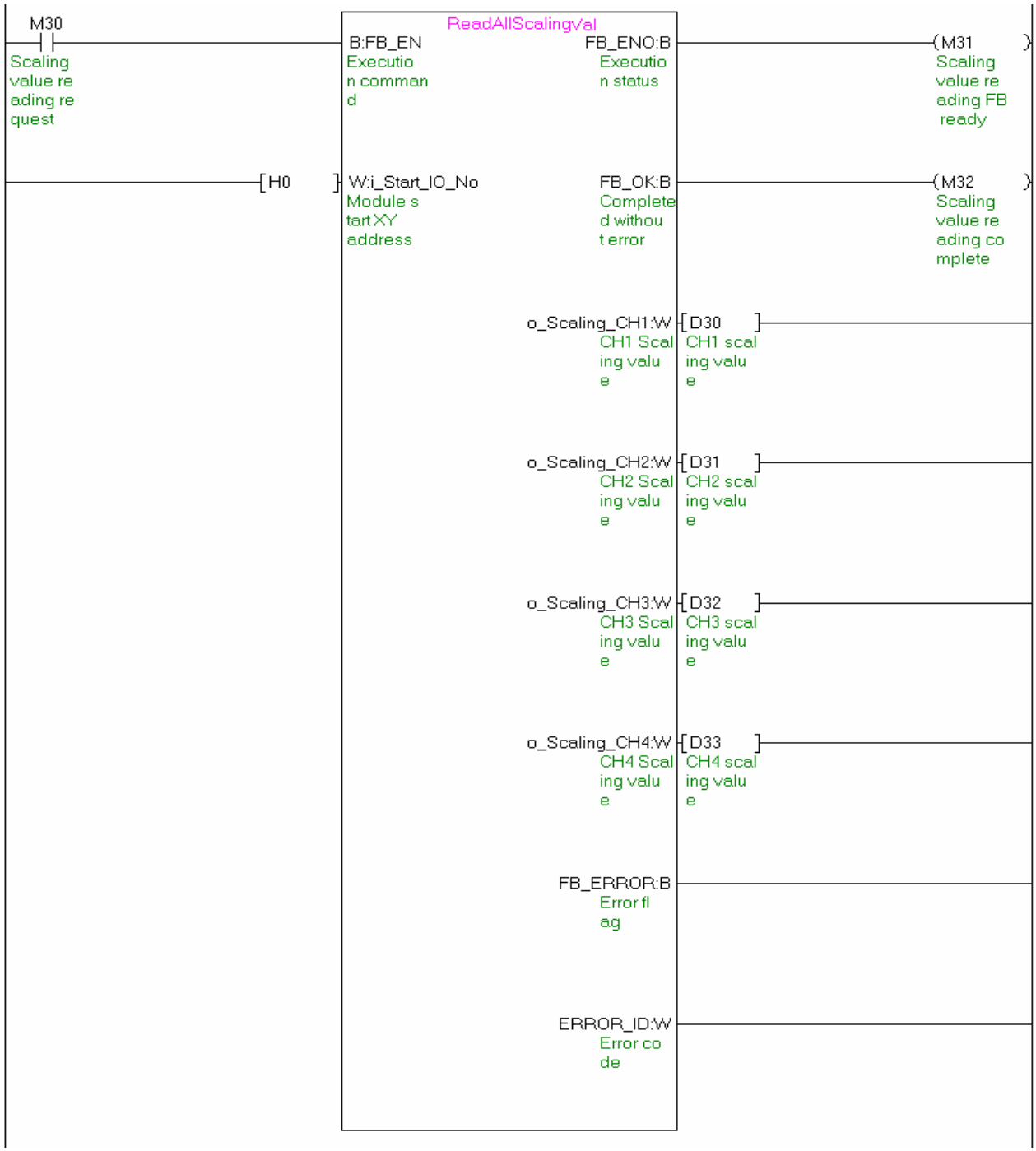
By turning ON M20, the scaling value (digital operation value) of channel 2 is read.



M+L60AD4_ReadAllScalingVal (Read all scaling values)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.

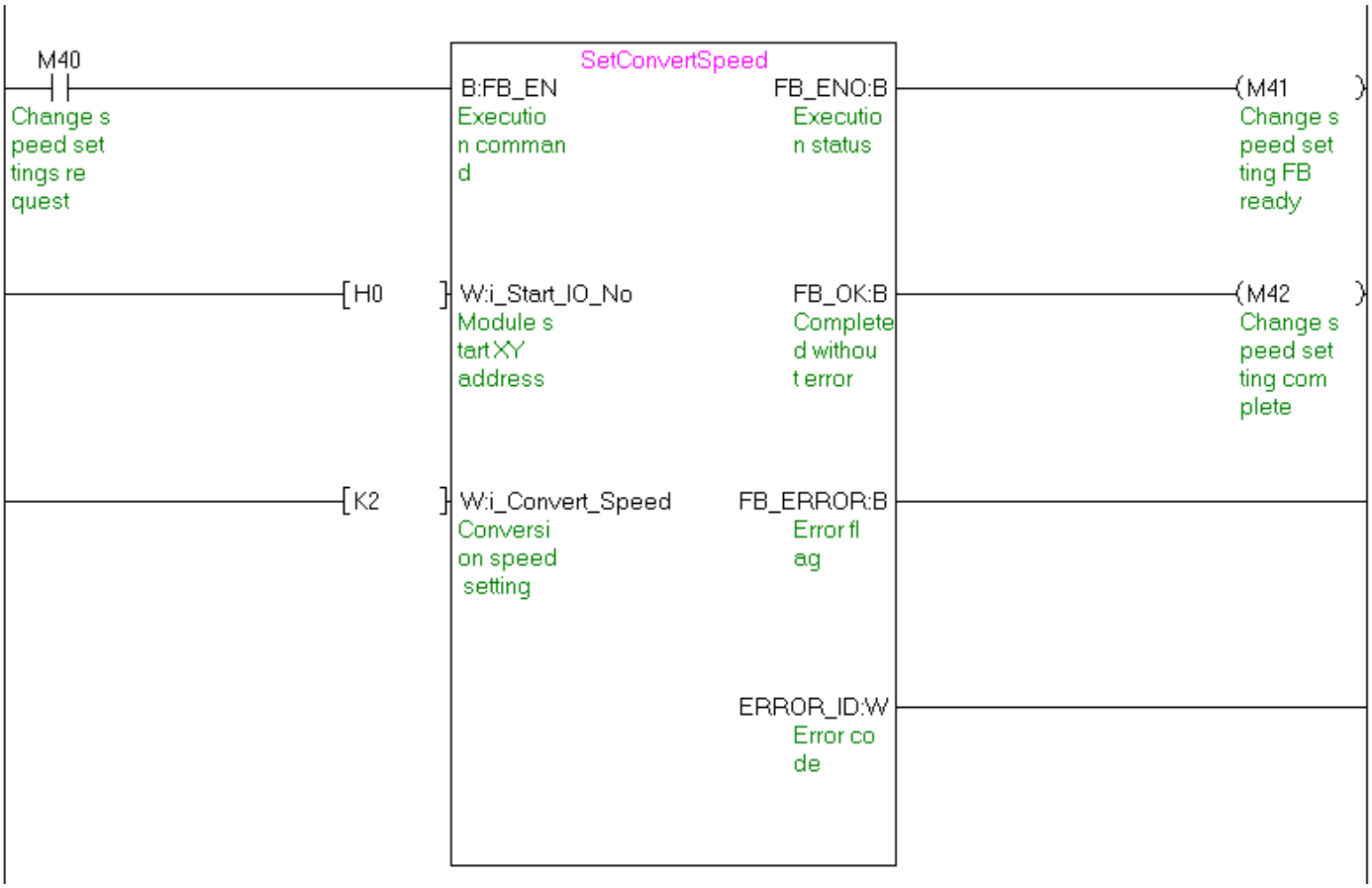
By turning ON M30, the scaling values (digital operation values) of all channels are read.



M+L60AD4_SetConvertSpeed (Conversion speed setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.
i_Convert_Speed	K2	Set the conversion speed of all channels to 1 ms.

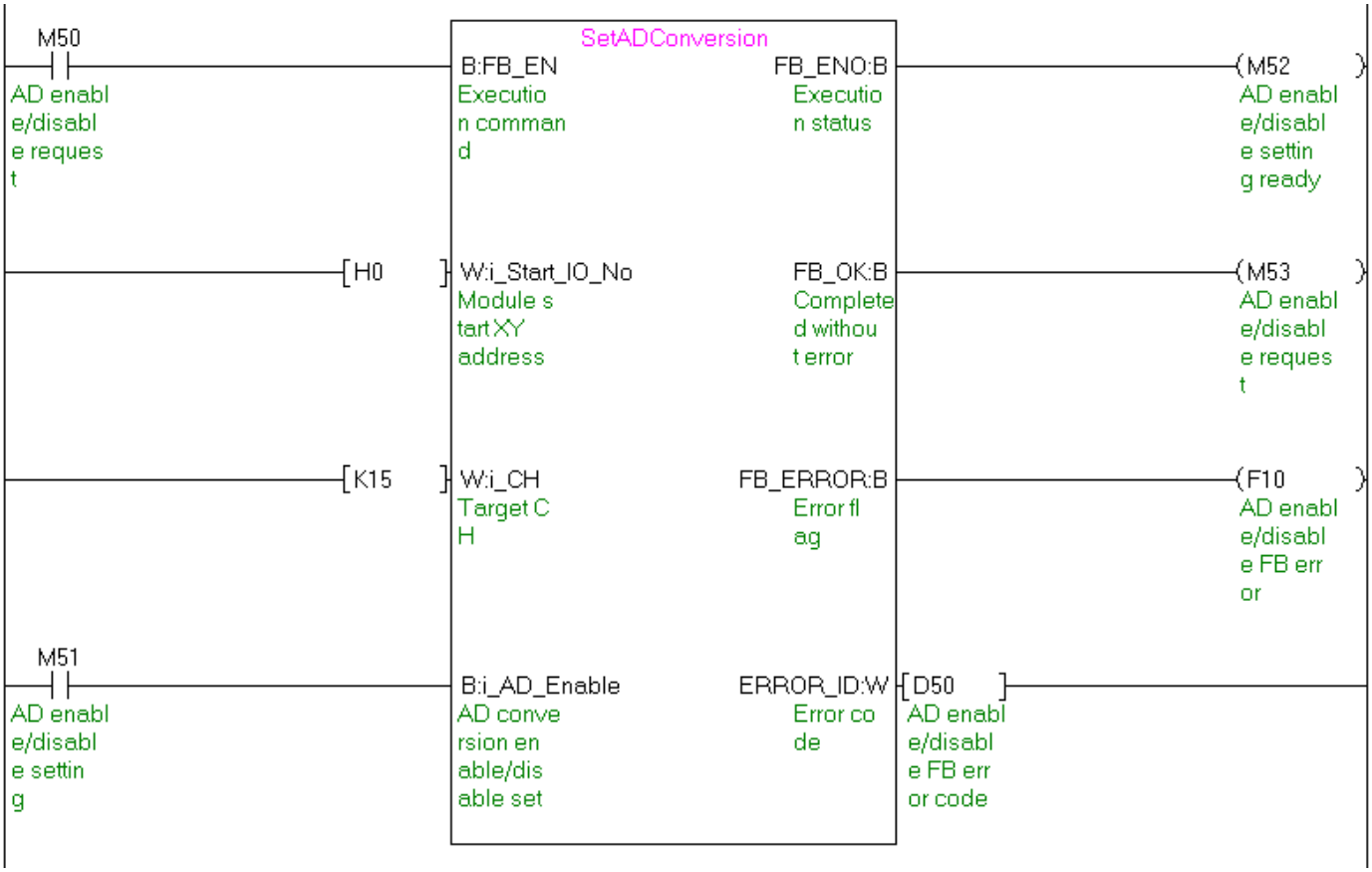
By turning ON M40, the conversion speed setting value is written to the buffer memory.



M+L60AD4_SetADConversion (Enable/disable AD conversion)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.
i_CH	K15	Specify the target channel to all channels.
i_AD_Enable	ON/OFF	Turn ON this parameter to enable the AD conversion of the target channel.

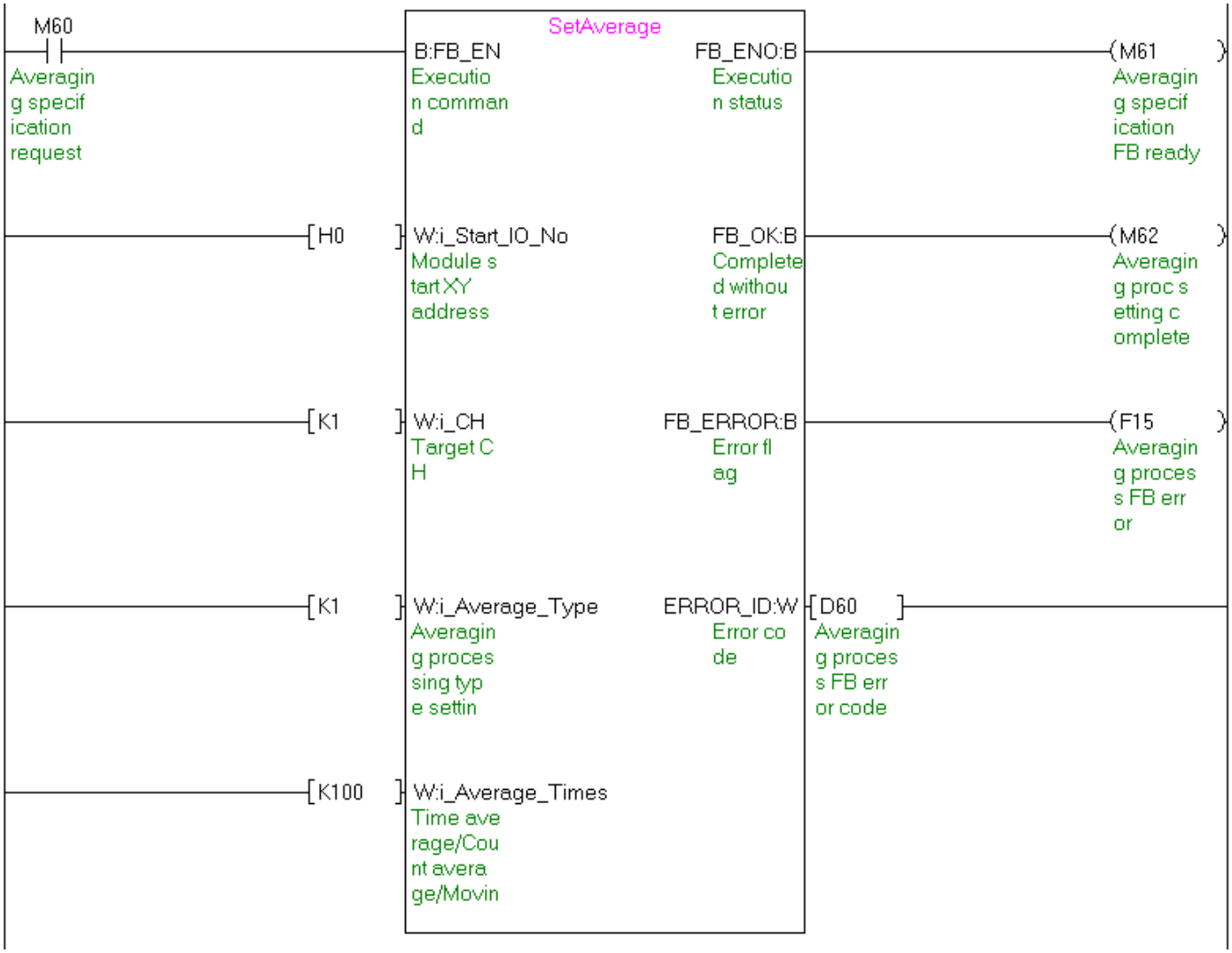
By turning ON M50, the conversion speed setting values of all changes are written to the buffer memory.



M+L60AD4_SetAverage (Averaging process setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.
i_CH	K1	Set the target channel to channel 1.
i_Average_Type	K1	Set the averaging processing type to "Time average".
i_Average_Times	K100	Set the time average to 100.

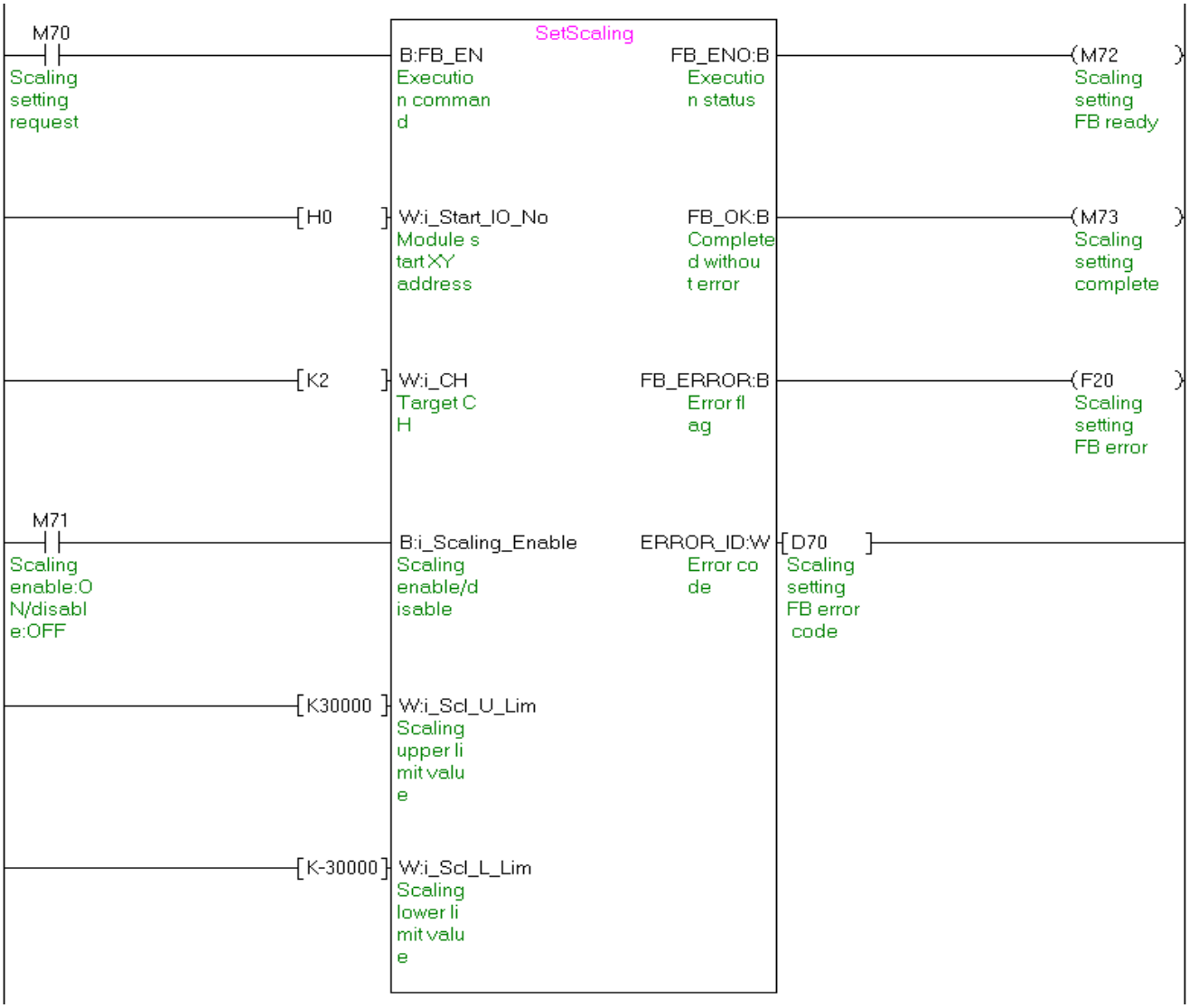
By turning ON M60, the averaging processing type setting value of channel 1 is written to the buffer memory.



M+L60AD4_SetScaling (Scaling setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.
i_CH	K2	Set the target channel to channel 2.
i_Scaling_Enable	ON/OFF	Turn ON to enable the scaling.
i_Scl_U_Lim	K30000	Set the scaling upper limit value to 30,000.
i_Scl_L_Lim	K-30000	Set the scaling lower limit value to -30,000.

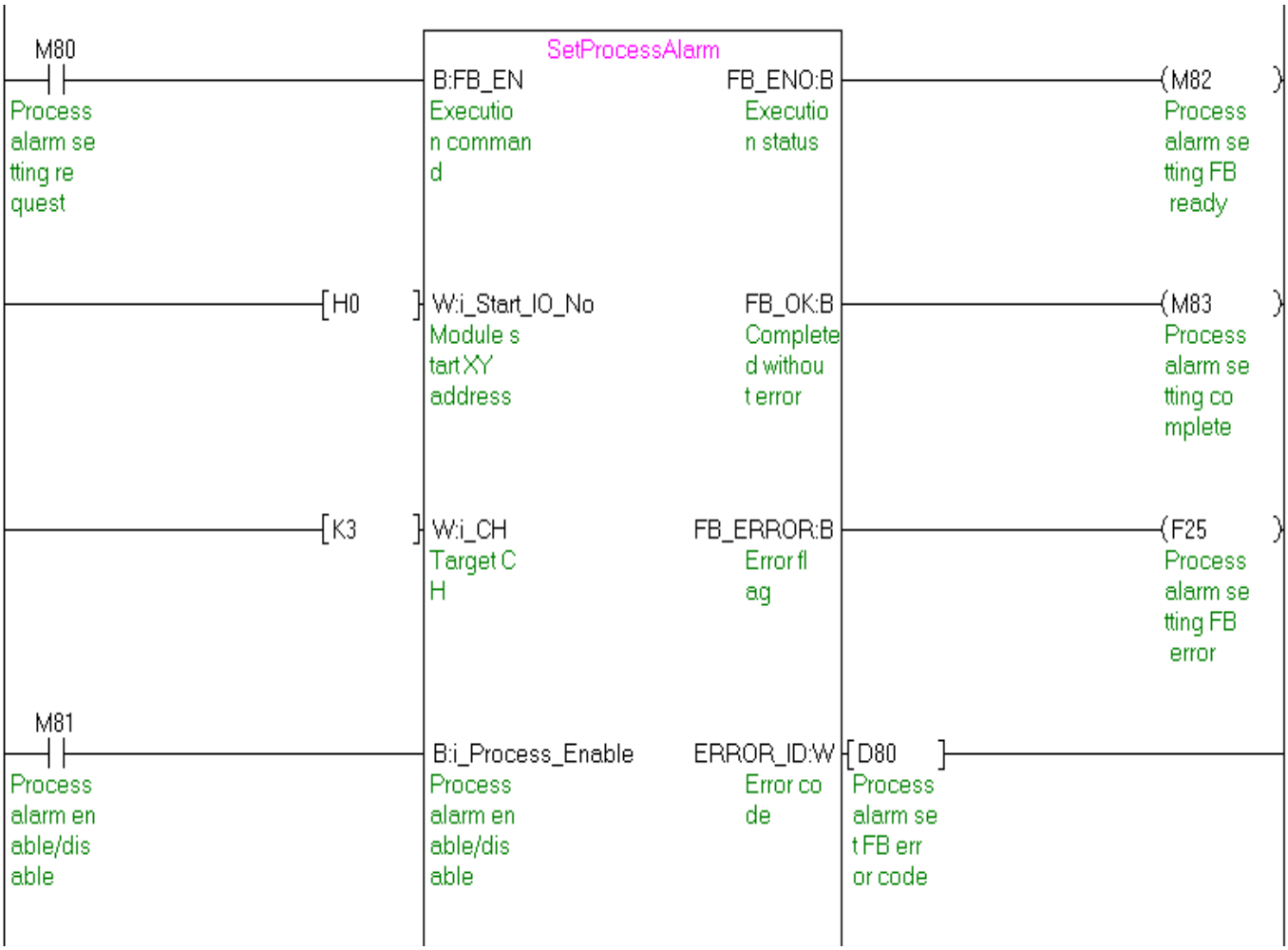
By turning ON M70, the scaling setting value of channel 2 is written to the buffer memory.



M+L60AD4_SetProcessAlarm (Process alarm setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.
i_CH	K3	Set the target channel to channel 3.
i_Process_Enable	ON/OFF	Turn ON to enable the warning output of the process alarm.
i_Pro_UU_Lim	K30000	Set the process alarm upper upper limit value to 30,000.
i_Pro_UL_Lim	K10000	Set the process alarm upper lower limit value to 10,000.
i_Pro_LU_Lim	K-10000	Set the process alarm lower upper limit value to -10,000.
i_Pro_LL_Lim	K-30000	Set the process alarm lower lower limit value to -30,000.

By turning ON M80, the process alarm setting value of channel 3 is written to the buffer memory.



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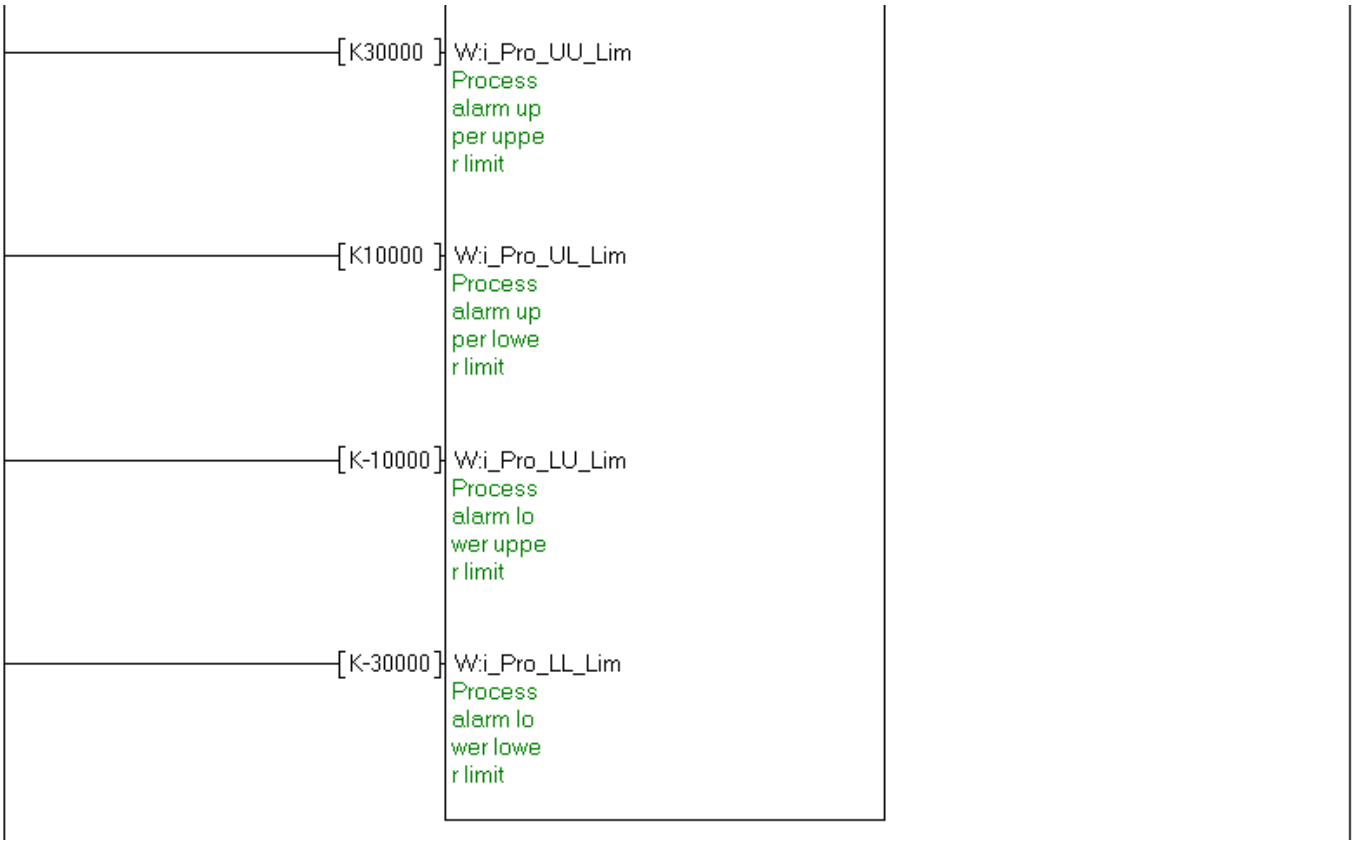
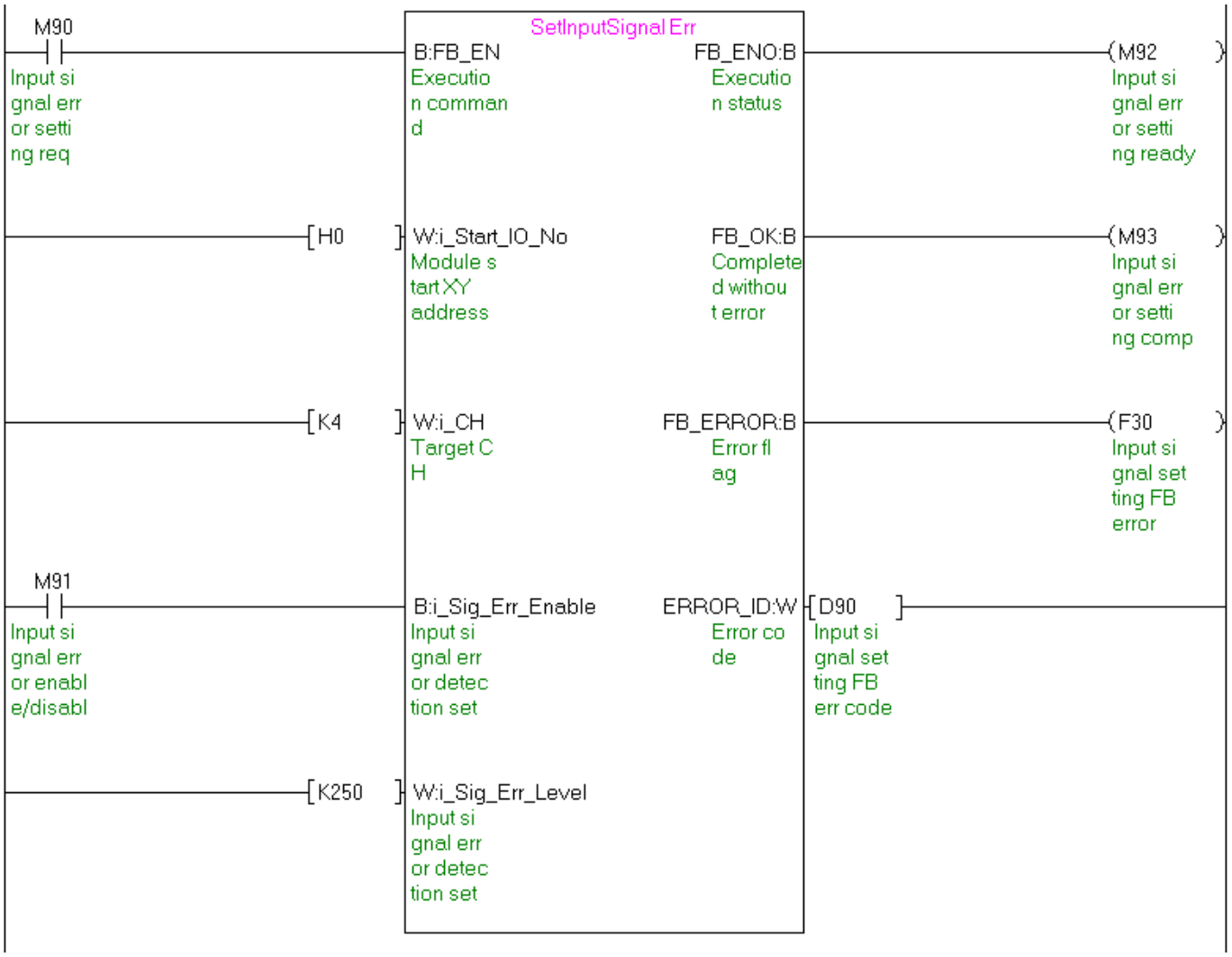

K30000
W:i_Pro_UU_Lim
Process
alarm up
per uppe
r limit
K10000
W:i_Pro_UL_Lim
Process
alarm up
per lowe
r limit
K-10000
W:i_Pro_LU_Lim
Process
alarm lo
wer uppe
r limit
K-30000
W:i_Pro_LL_Lim
Process
alarm lo
wer lowe
r limit

M+L60AD4_SetInputSignalErr (Input signal error detection setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.
i_CH	K4	Set the target channel to channel 4.
i_Sig_Err_Enable	ON/OFF	Turn ON to enable the input signal error detection setting.
i_Sig_Err_Level	K250	Set the input signal error detection setting value to 25.0%.

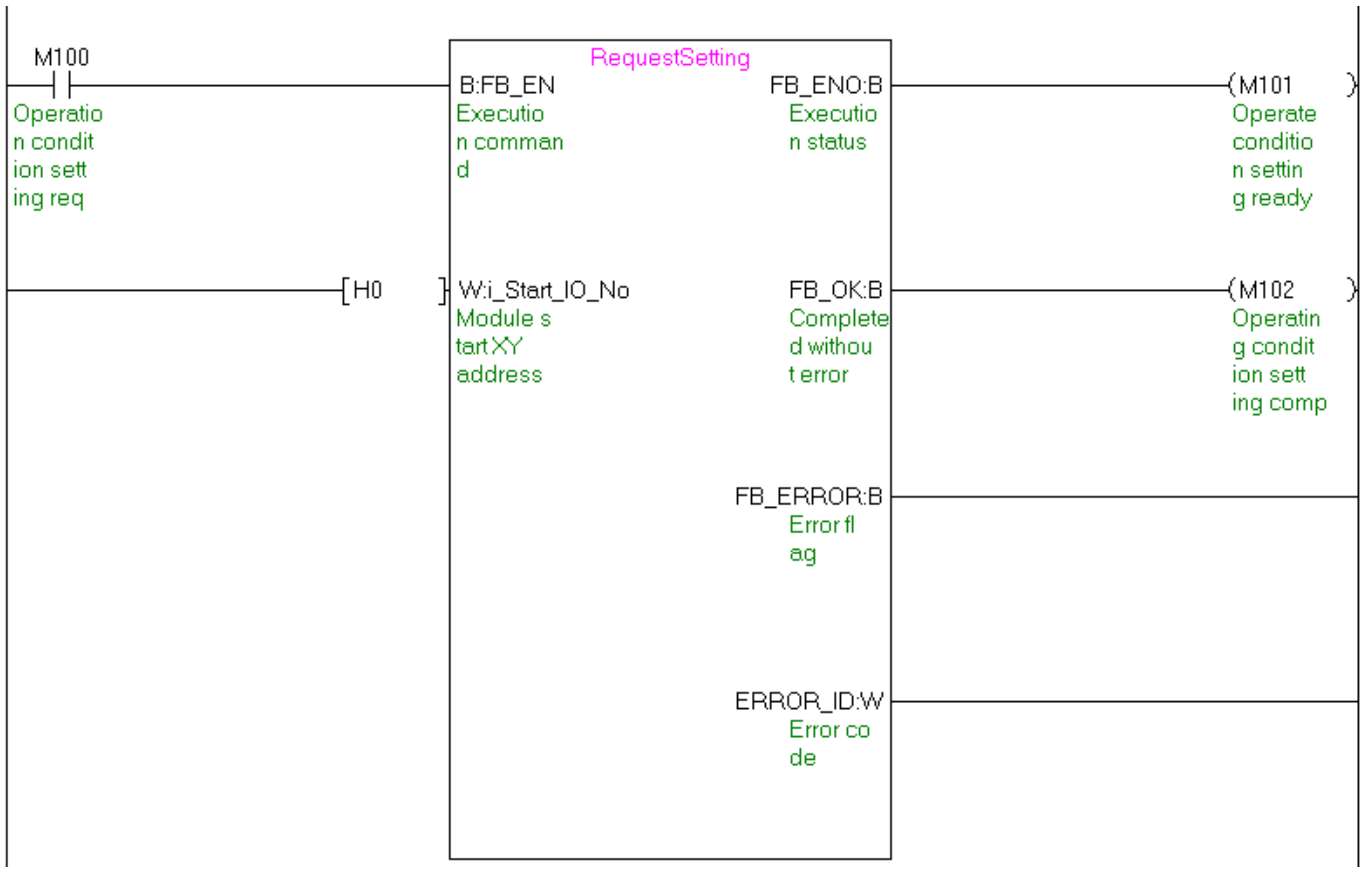
By turning ON M90, the input signal error detection setting value of channel 4 is written to the buffer memory.



M+L60AD4_RequestSetting (Operation condition setting request)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.

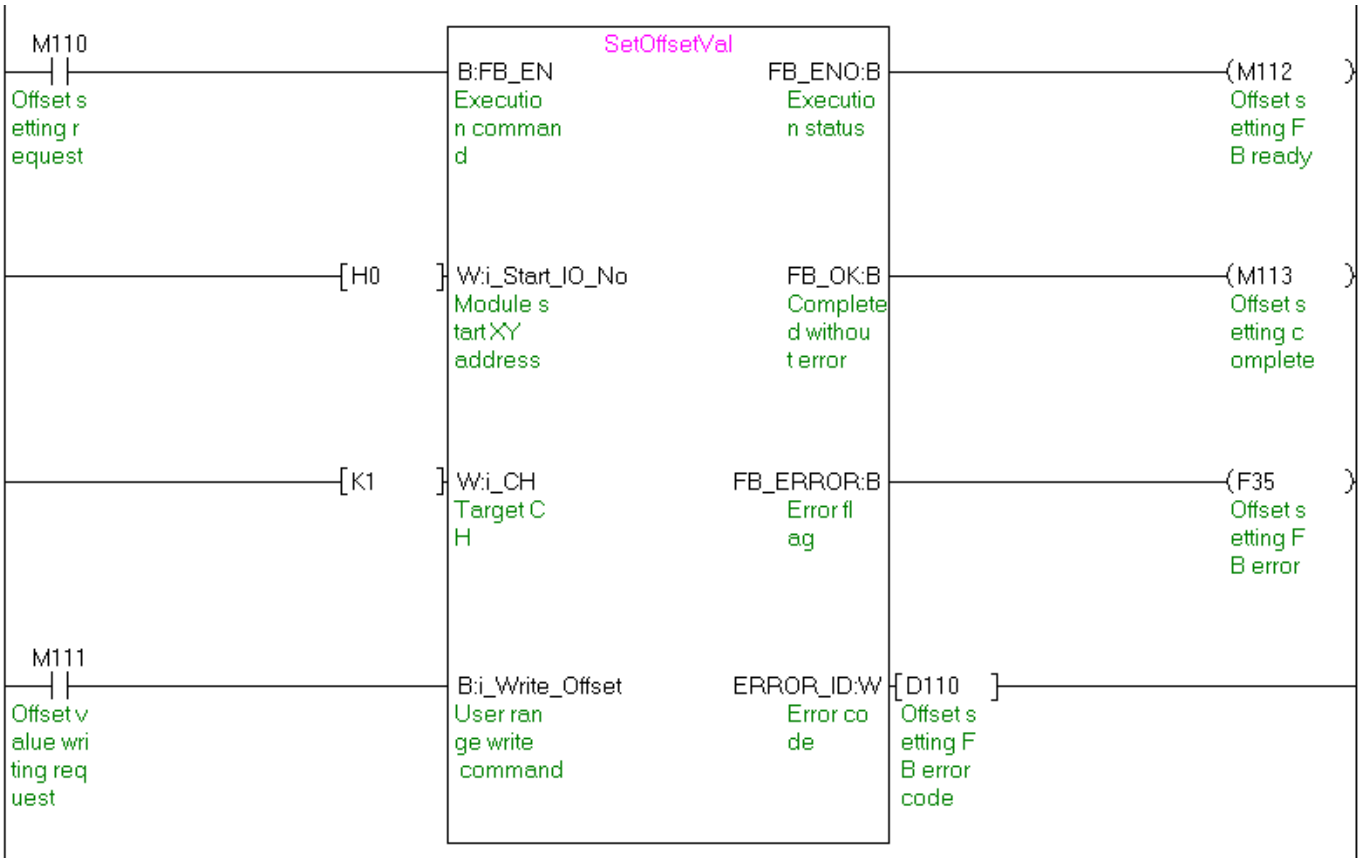
By turning ON M100, the settings of the enable/disable AD conversion, averaging process setting, input signal error detection extension setting, digital clipping setting, input signal error detection setting, conversion speed setting, warning output setting, scaling setting, logging function parameter setting and flow amount integration function setting are enabled.



M+L60AD4_SetOffsetVal (Offset setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.
i_CH	K1	Set the target channel to channel 1.
i_Write_Offset	ON/OFF	Turn ON to perform the user range write operation for channel 1.

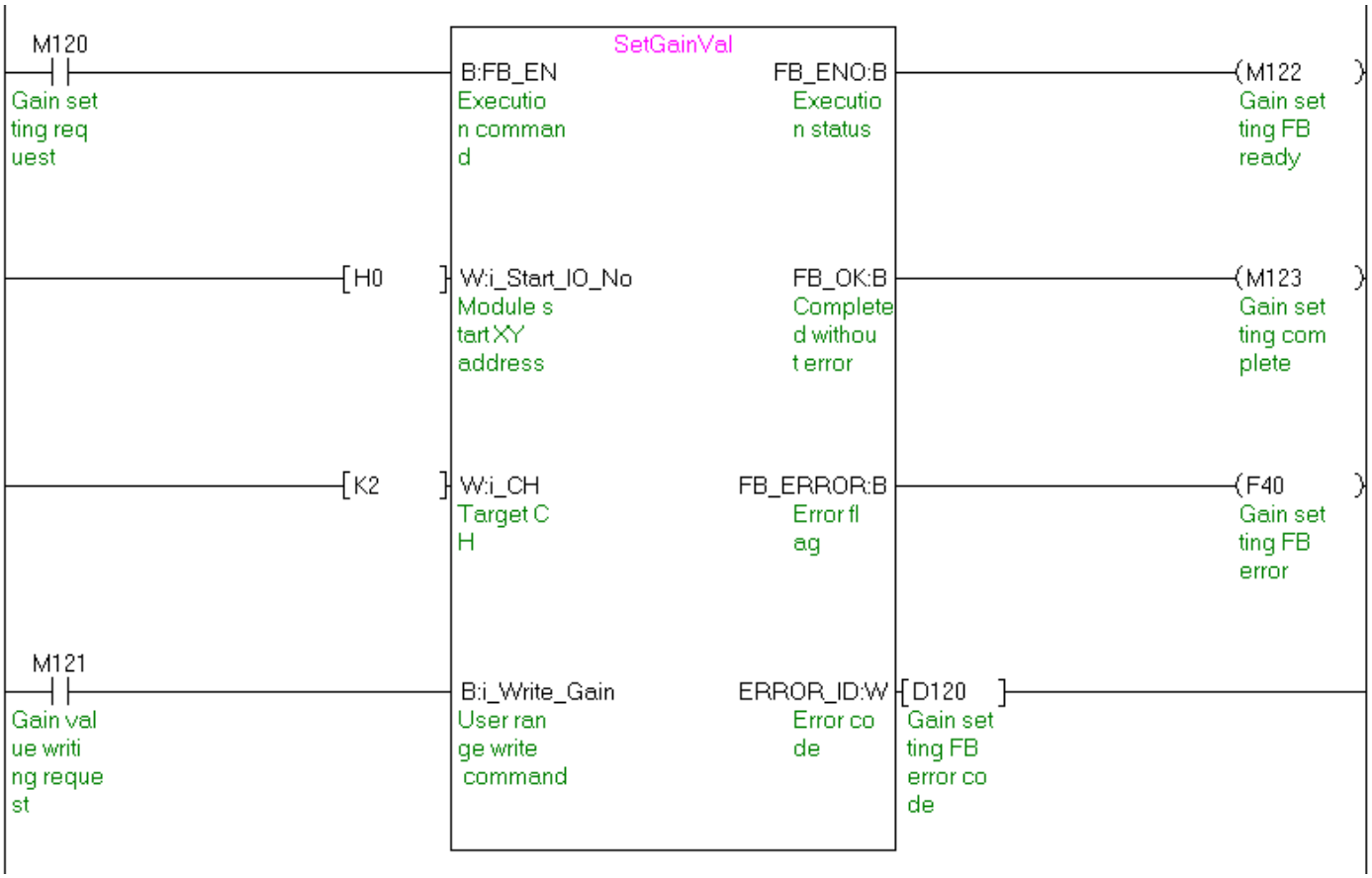
By turning ON M110 and then M111, the offset value of channel 1 is written.



M+L60AD4_SetGainVal (Gain setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.
i_CH	K2	Set the target channel to channel 2.
i_Write_Gain	ON/OFF	Turn ON to perform the user range write operation for channel 2.

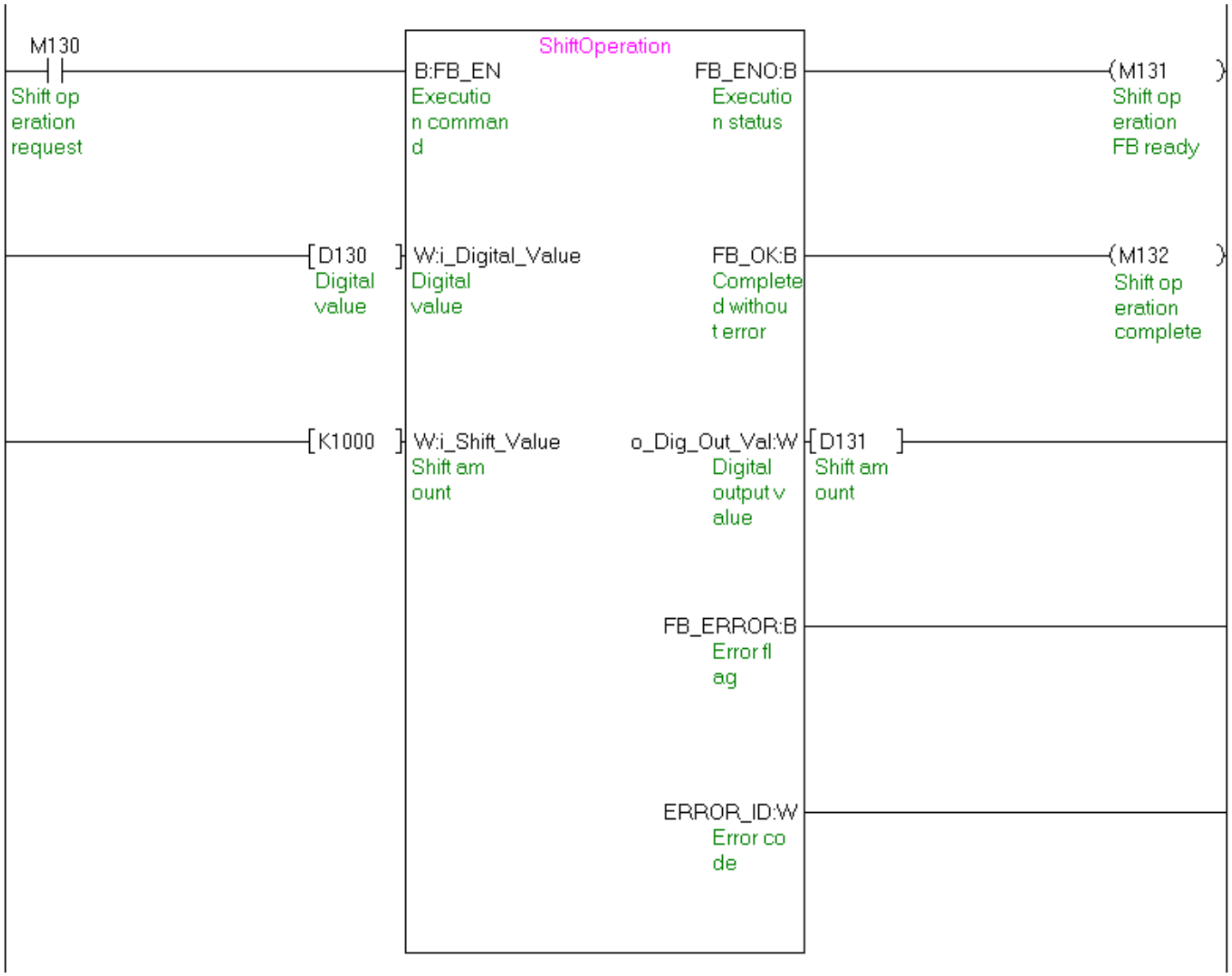
By turning ON M120 and then M121, the gain value of channel 2 is written.



M+L60AD4_ShiftOperation (Shift operation)

Label name	Setting value	Description
i_Digital_Value	-	Store the digital output value to which to add the shift amount.
i_Shift_Value	K1000	Set the shift amount to 1,000.

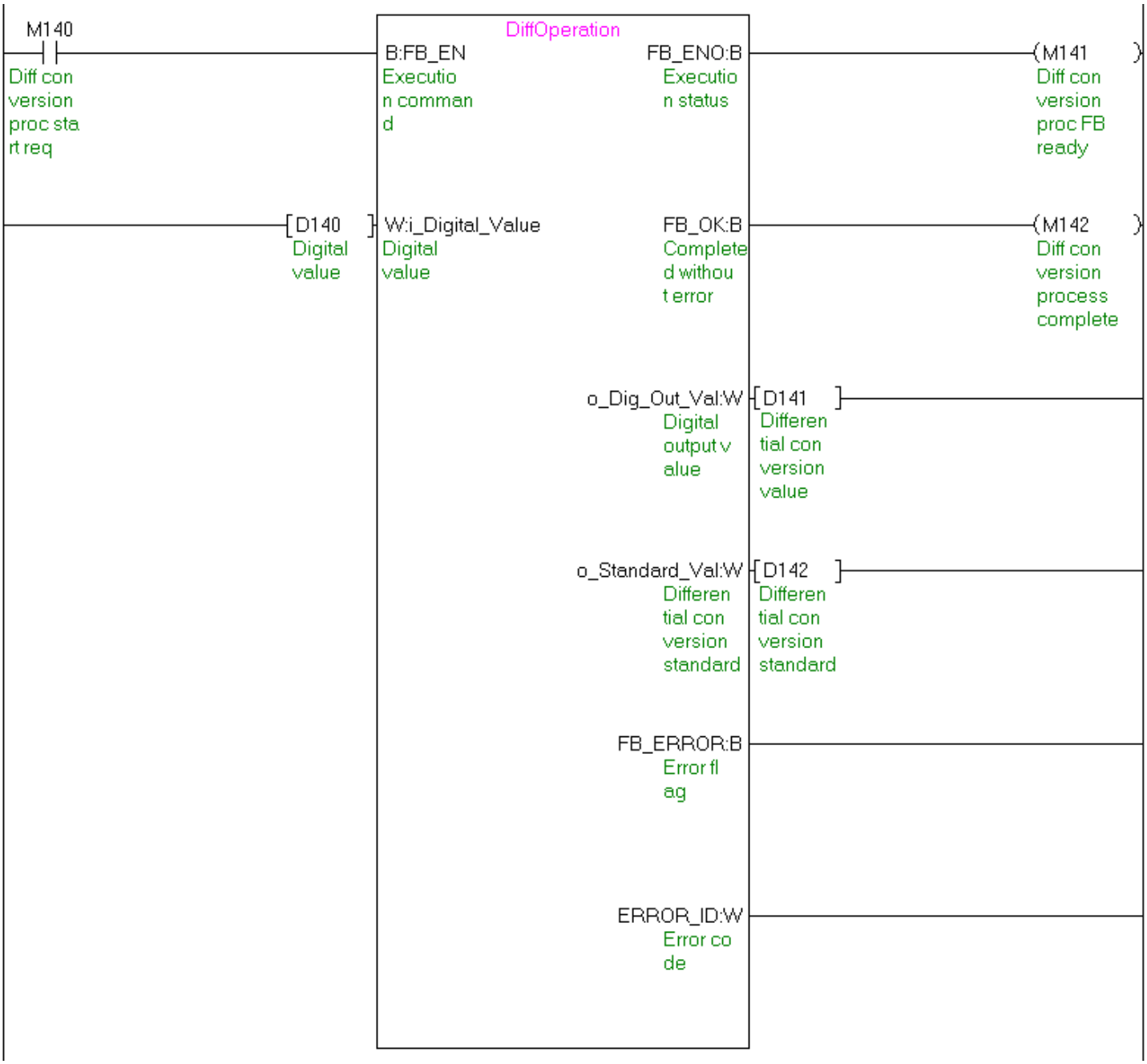
By turning ON M130, the sum obtained by adding the input digital output value to the shift amount is output.



M+L60AD4_DiffOperation (Differential conversion process)

Label name	Setting value	Description
i_Digital_Value	-	Store the digital value for which to perform the differential conversion.

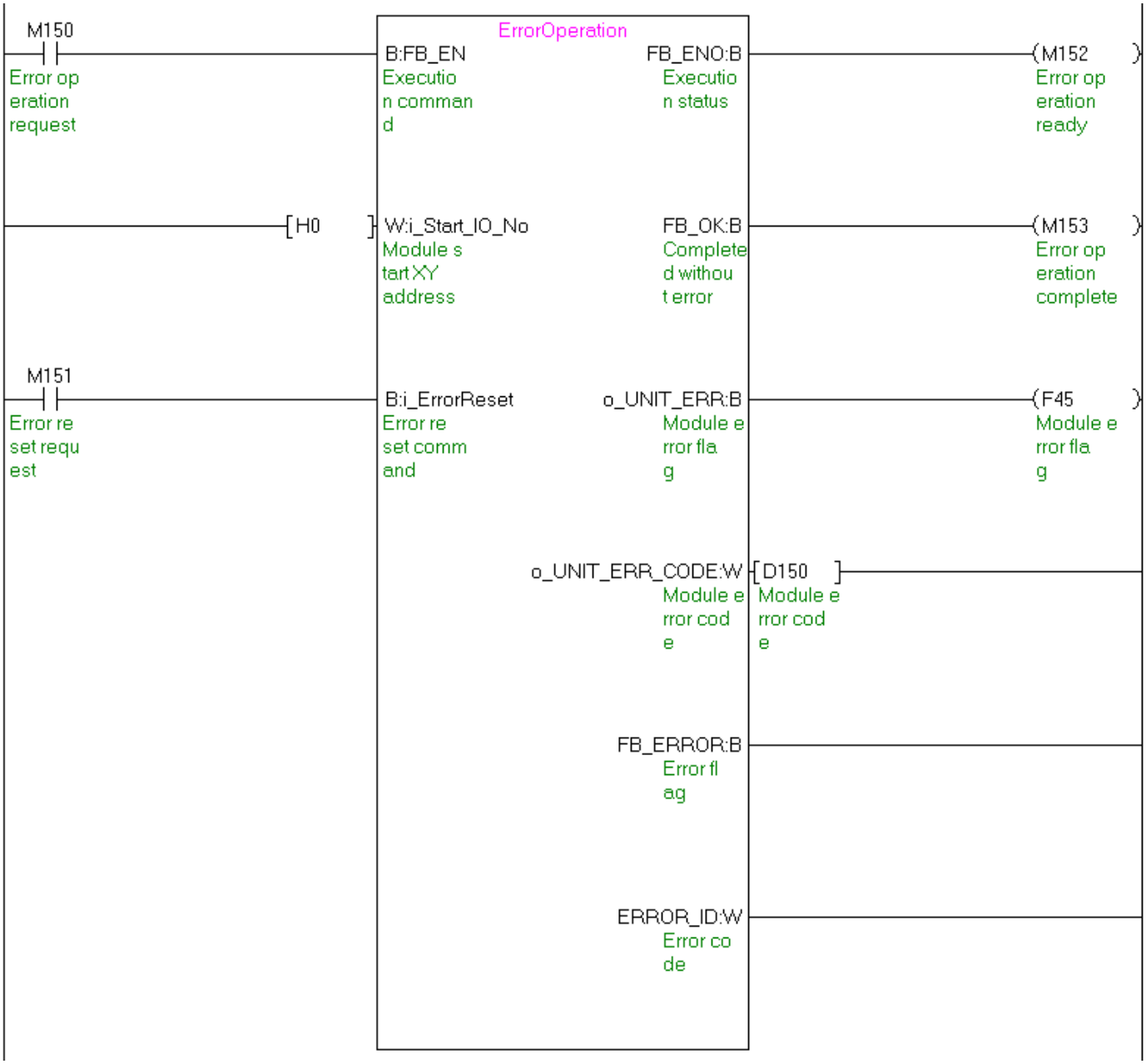
By turning ON M140, the difference obtained by subtracting the standard value from the input digital value is output.



M+L60AD4_ErrorOperation (Error operation)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.
i_ErrorReset	ON/OFF	Turn ON to reset errors.

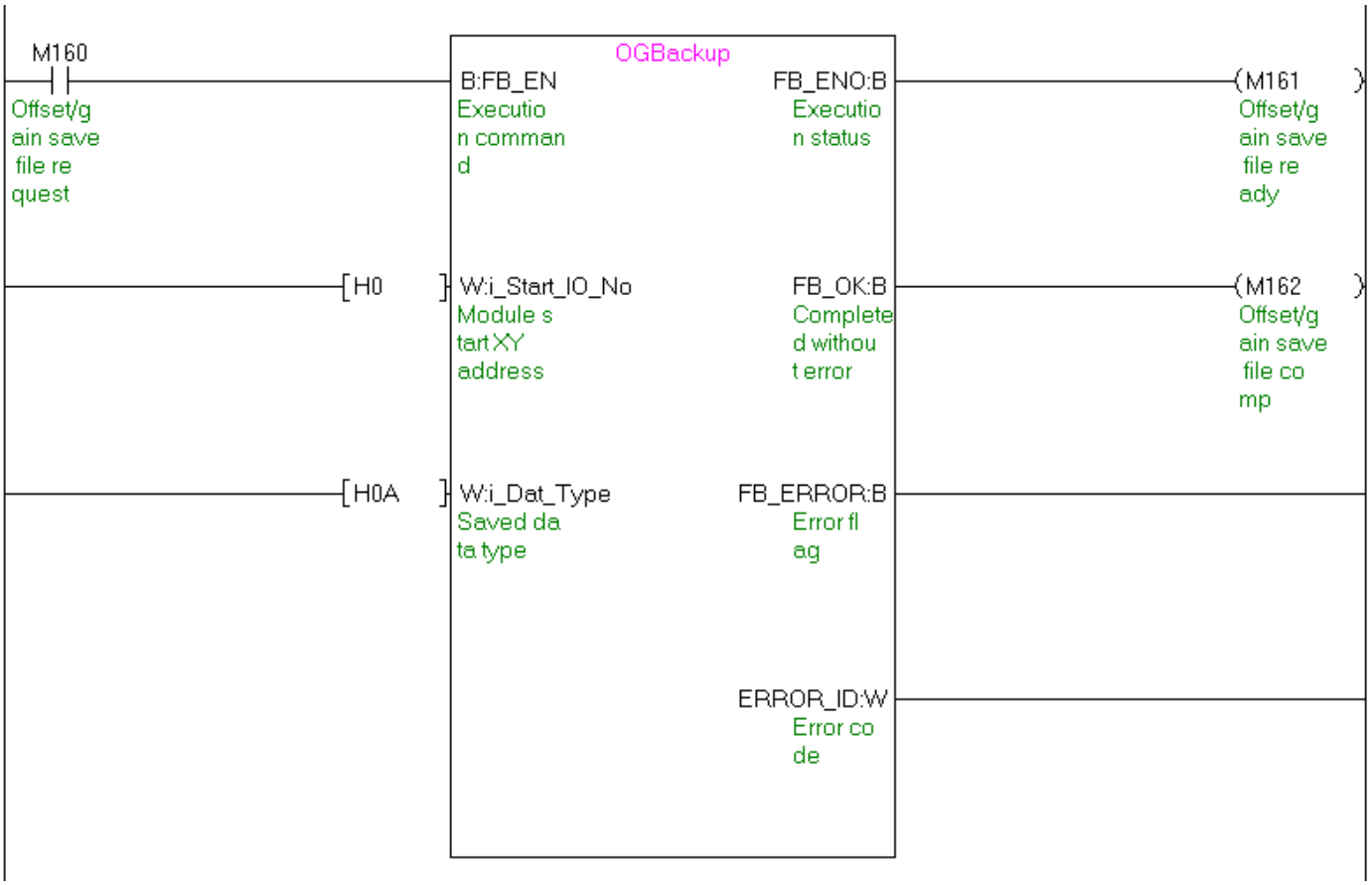
By turning ON M150, an error code is output if an error occurs. After an error output, by turning ON M151, the error is reset.



M+L60AD4_OGBackup (Offset/gain value save)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.
i_Dat_Type	H0A	Set the saved data type to "Voltage" for channels 1 and 3 and "Current" for channels 2 and 4.

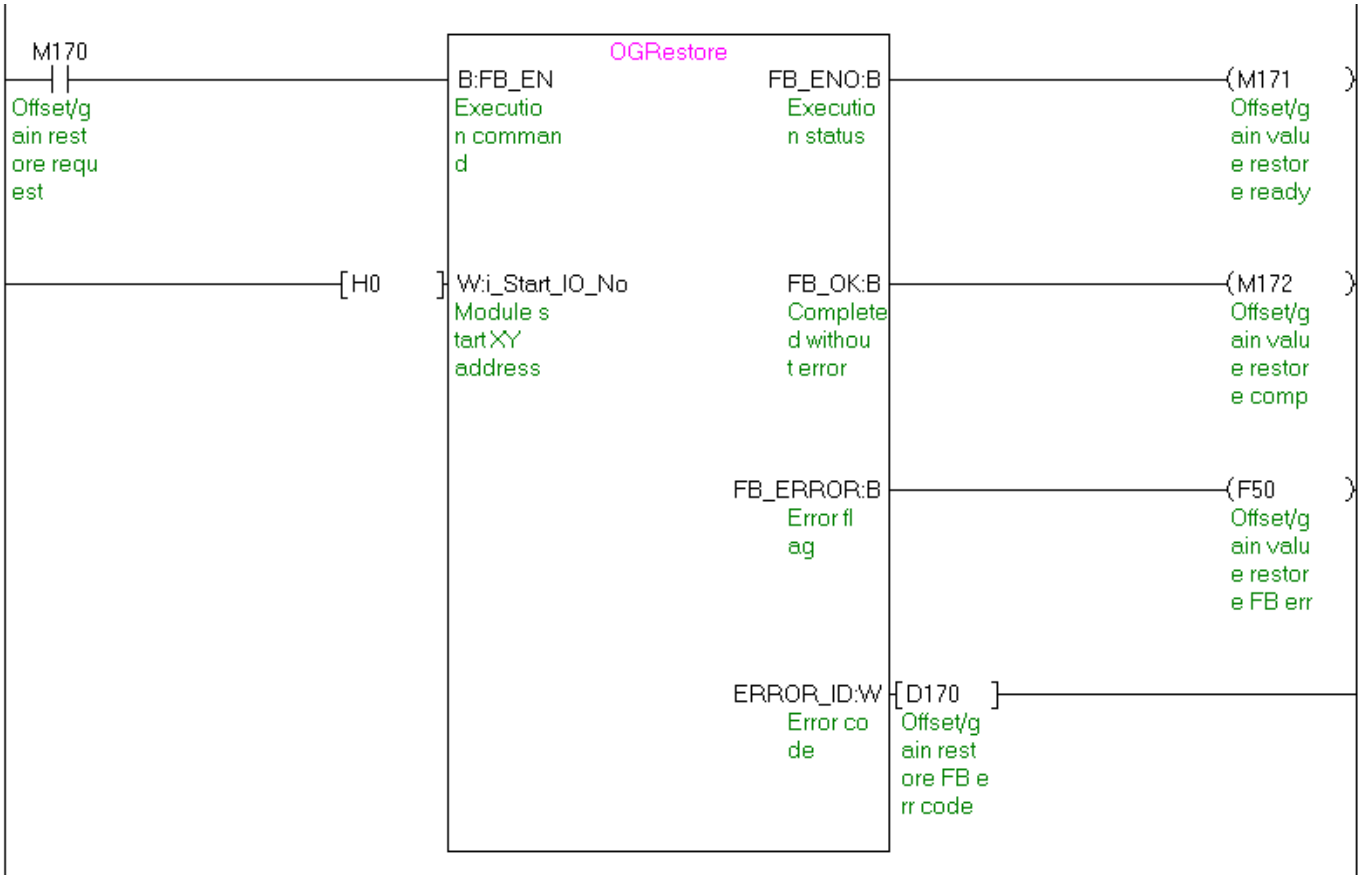
By turning ON M160, the offset/gain value of the user range setting is read and saved in a file to an SD memory card which is mounted on the CPU module.



M+L60AD4_OGRestore (Offset/gain value restore)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.

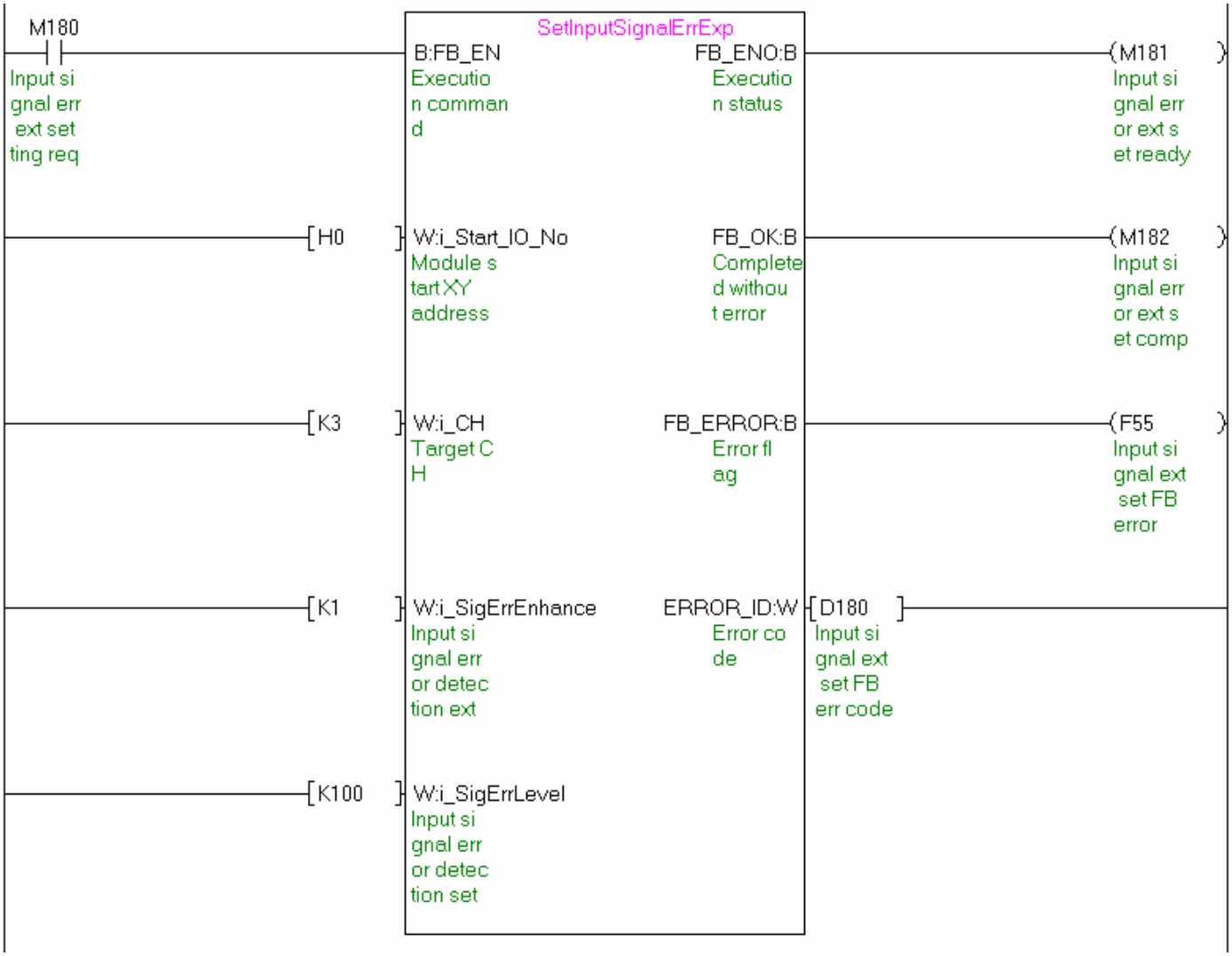
By turning ON M170, the offset/gain setting value of the user range setting is restored from the SD memory card.



M+L60AD4_SetInputSignalErrExp (Input signal error detection extension setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.
i_CH	K3	Set the target channel to channel 3.
i_SigErrEnhance	K1	Set the input signal error detection extension setting of channel 3 to "Upper lower limit detection".
i_SigErrLevel	K100	Set the input signal error detection setting value to 10.0%.

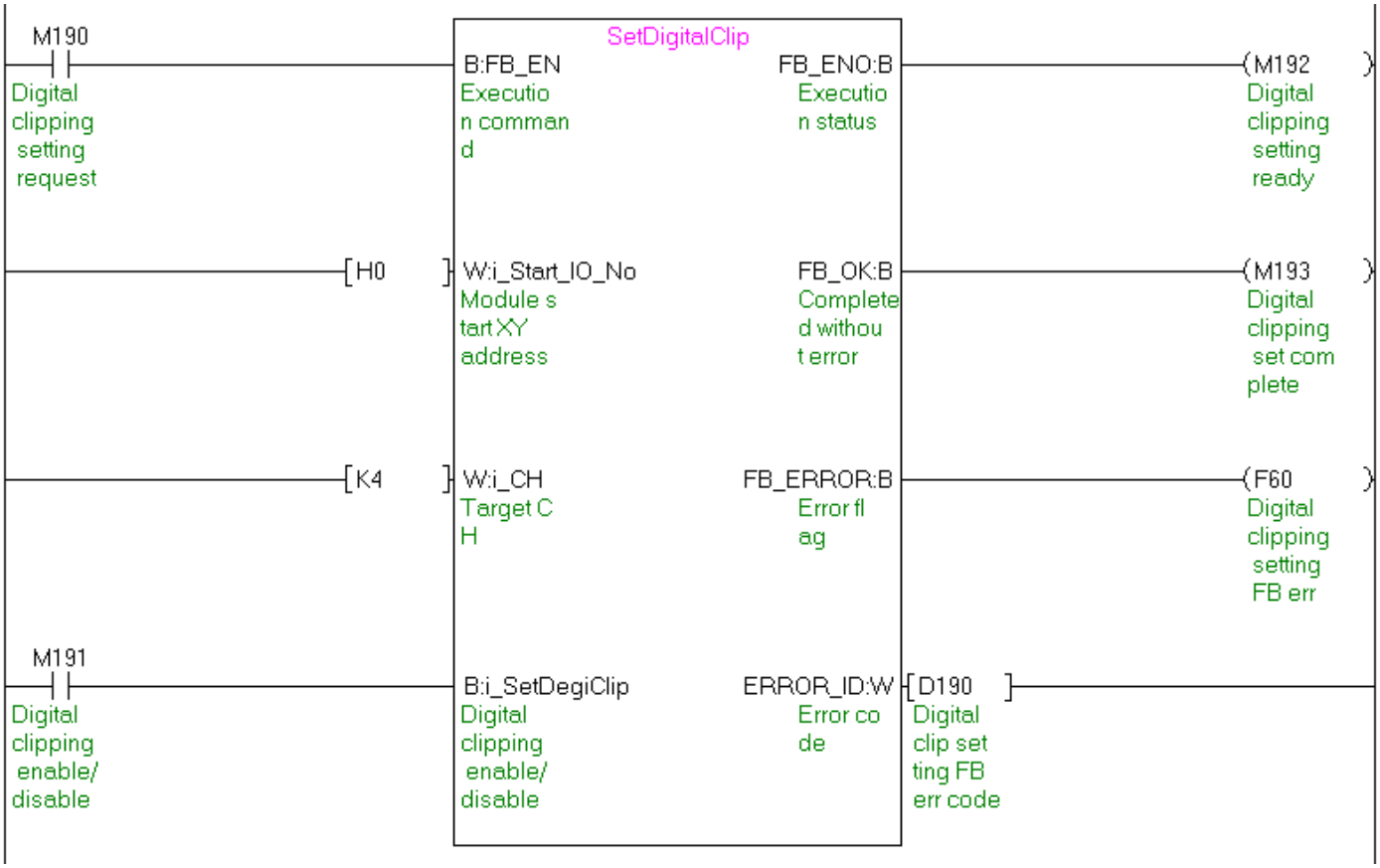
By turning ON M180, the input signal error detection extension setting value of channel 3 is written to the buffer memory.



M+L60AD4_SetDigitalClip (Digital clipping setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.
i_CH	K4	Set the target channel to channel 4.
i_SetDegiClip	ON/OFF	Turn ON to enable the digital clipping function.

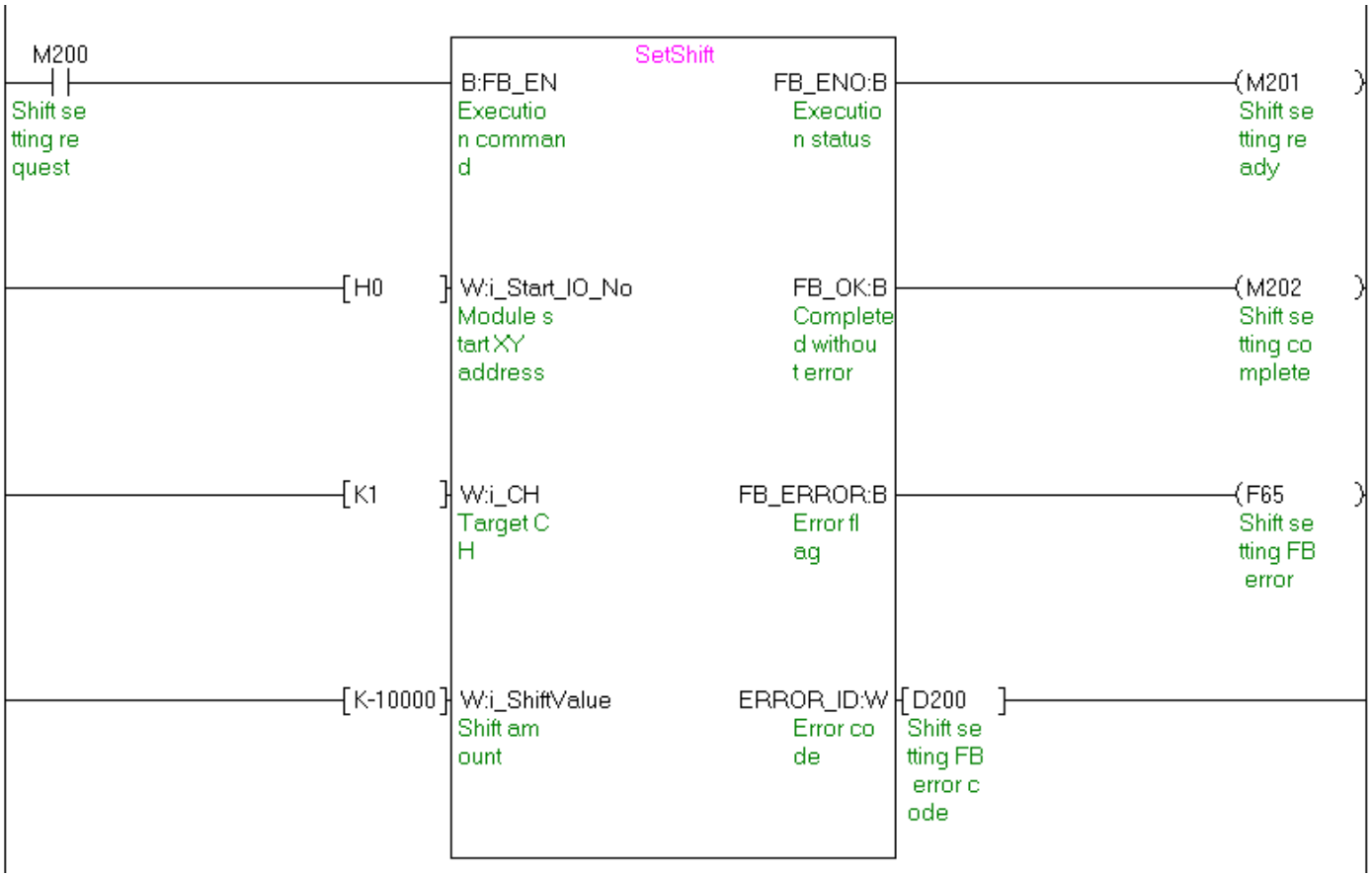
By turning ON M190, the digital clipping setting value of channel 4 is written to the buffer memory.



M+L60AD4_SetShift (Shift setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.
i_CH	K1	Set the target channel to channel 1.
i_ShiftValue	K-10000	Set the shift amount to -10,000.

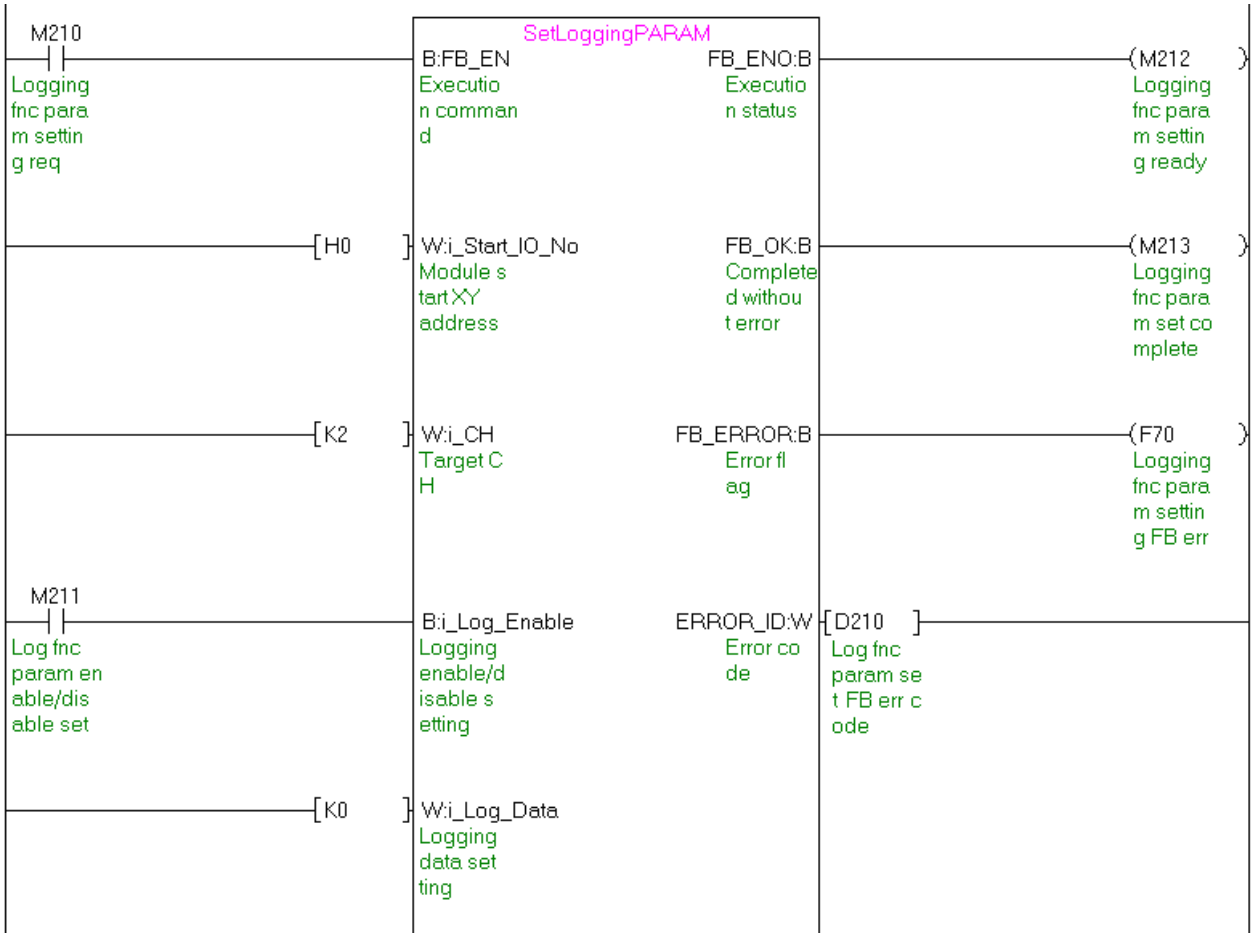
By turning ON M200, the shift setting value of channel 1 is written to the buffer memory.



M+L60AD4_SetLoggingPARAM (Logging function parameter setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.
i_CH	K2	Set the target channel to channel 2.
i_Log_Enable	ON/OFF	Turn ON to enable the logging.
i_Log_Data	K0	Set the logging data to "Digital output value".
i_Log_Cycle_Val	K320	Set the cycle to save the logging data to 320 µs.
i_Log_Cycle_Unit	K0	Set the time unit of the logging cycle to "µs".
i_Log_Points	K1	Set the data points to record from when the hold trigger occurs until the logging function stops temporarily to 1.
i_Log_Trig_Cond	K1	Set the condition to cause the level trigger "Above".
i_Log_Trig_Data	K12	Set the buffer memory address to operate the level trigger to 12.
i_Log_Trig_Value	K10000	Set the level at which the level trigger occurs to 10,000.

By turning ON M210, the logging function parameter setting value of channel 2 is written to the buffer memory.



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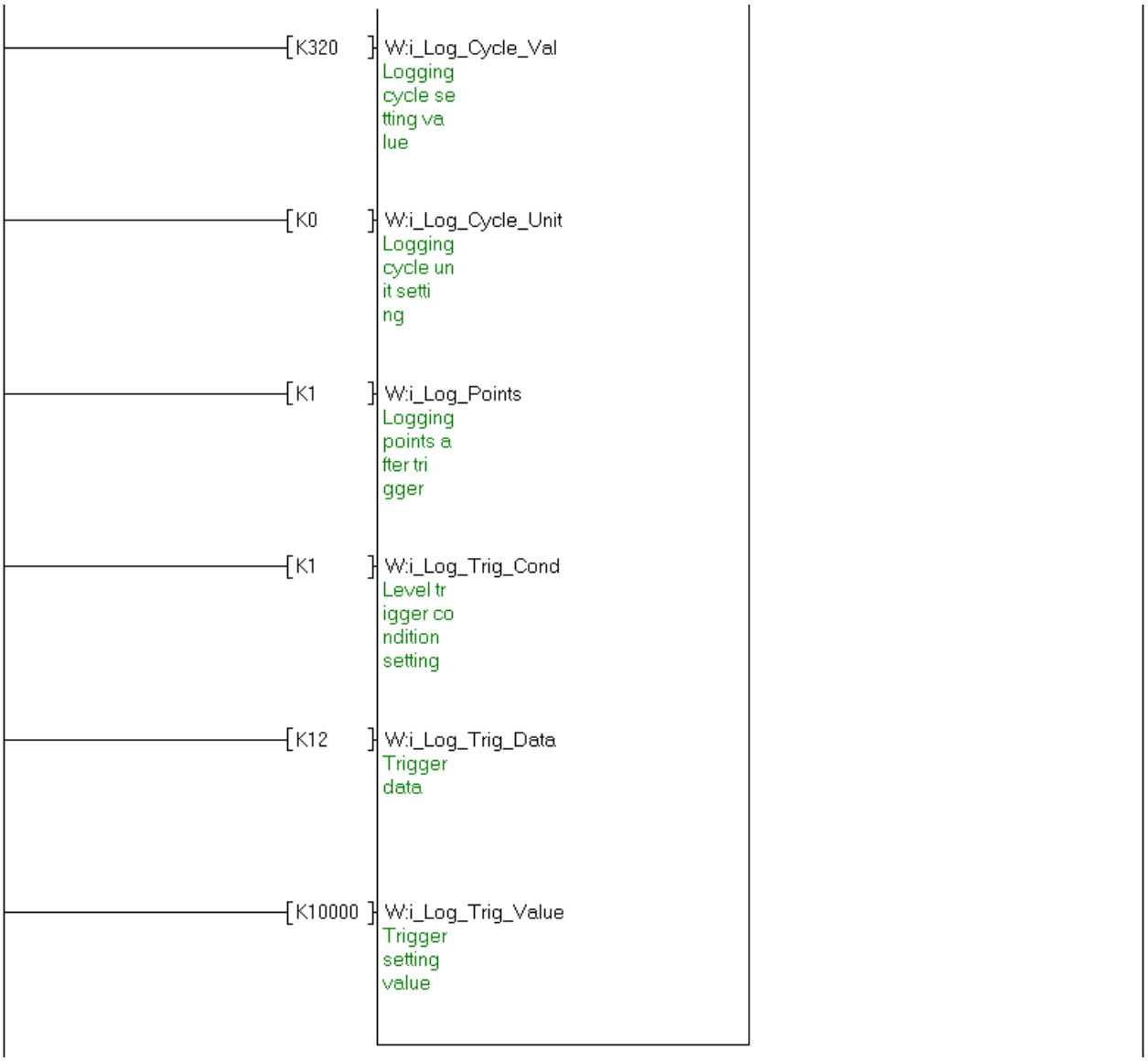
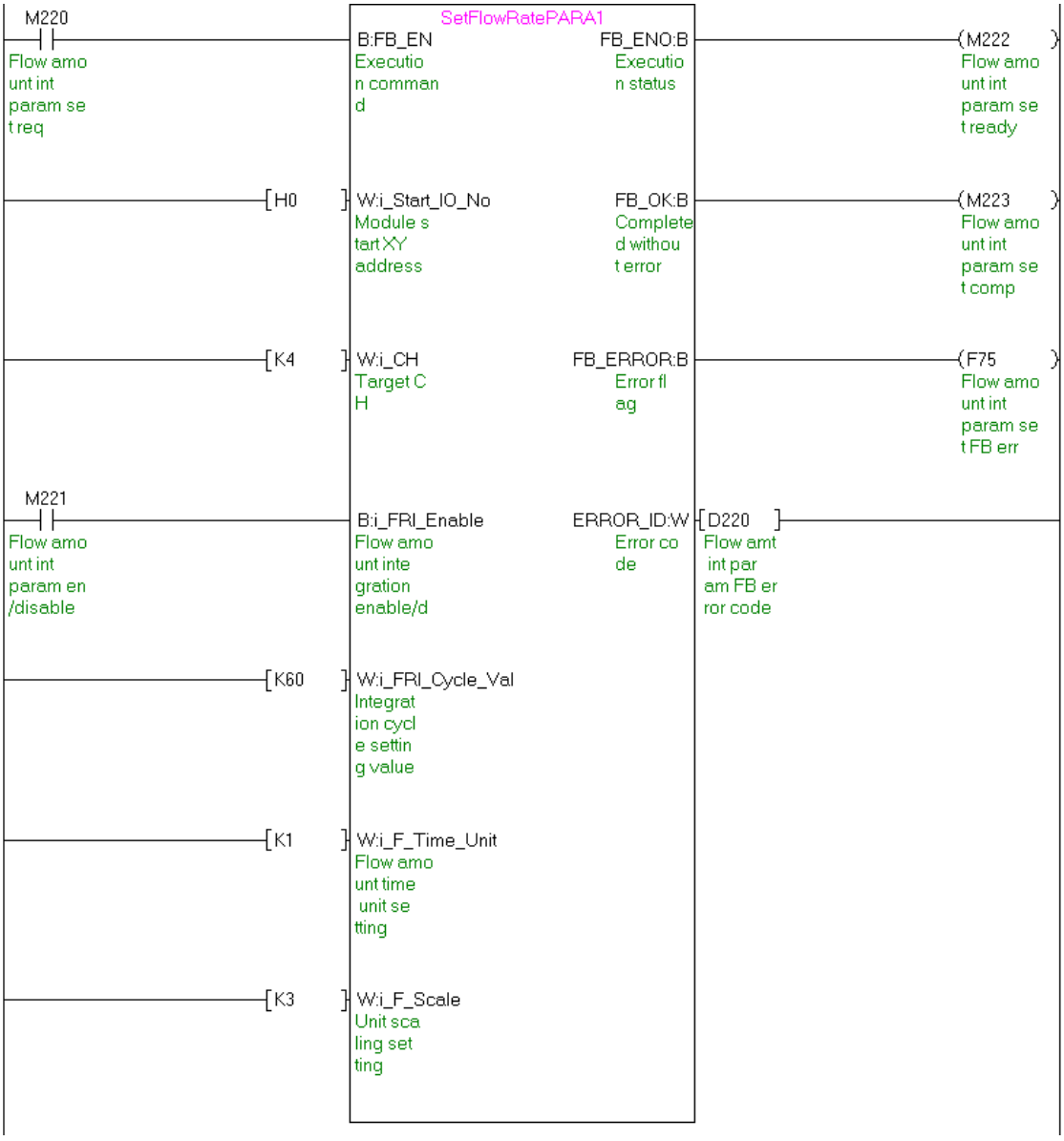

K320
W:i_Log_Cycle_Val
Logging cycle setting value
K0
W:i_Log_Cycle_Unit
Logging cycle unit setting
K1
W:i_Log_Points
Logging points after trigger
K1
W:i_Log_Trig_Cond
Level trigger condition setting
K12
W:i_Log_Trig_Data
Trigger data
K10000
W:i_Log_Trig_Value
Trigger setting value

M+L60AD4_SetFlowRatePARAM (Flow amount integration function parameter setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.
i_CH	K4	Set the target channel to channel 4.
i_FRI_Enable	ON/OFF	Turn ON to enable the flow amount integration function.
i_FRI_Cycle_Val	K60	Set the integration cycle of the connected flow meter to 60 ms.
i_F_Time_Unit	K1	Set the time unit of the flow meter to "min".
i_F_Scale	K3	Specify the unit scale of the integrated flow amount to "×1,000".

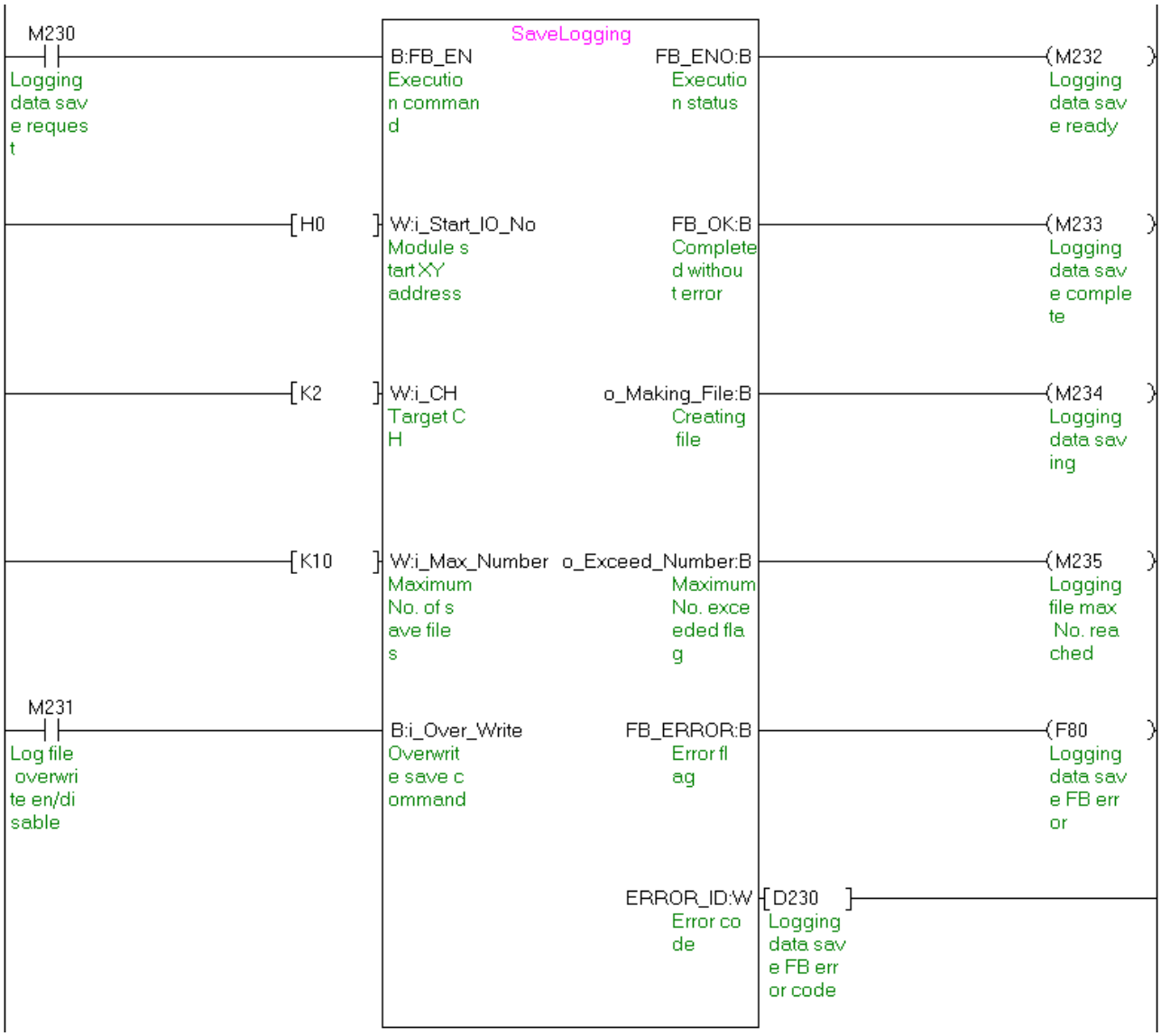
By turning ON M220, the flow amount integration function parameter setting value of channel 4 is written to the buffer memory.



M+L60AD4_SaveLogging (Logging data save)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.
i_CH	K2	Set the target channel to channel 2.
i_Max_Number	K10	Set the maximum number of CSV files to be saved to 10.
i_Over_Write	ON/OFF	Set whether to overwrite the file to which the logging data is written.

By turning ON M230, the logging data from the start pointer of channel 2 for the number of the logging data are sorted chronologically. Then, the logging data and the trigger occurrence information are saved in CSV format in the SD memory card mounted on the CPU.



M+L60AD4_MakeFlowRateDailyReport (Flow amount daily report creation)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60AD4 module is mounted to 0H.

By turning ON M240, the "flow amount per hour" that flows on the hour for 24 hours and "total flow amount of the day" are calculated based on the integrated flow amount of the L60AD4. Then, they are saved in a flow amount daily report file in CSV format in an SD memory card mounted on the CPU module at 12 am every day.